

THE MEASUREMENT OF ACHIEVEMENT
IN
SILENT READING

SANGREN

The Measurement of Achievement in Silent Reading

By

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—P. V. S.

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CHAPTER I

INTRODUCTION

The psychology and pedagogy of reading have made very significant advances during the last decade. One of the most important forward steps came with the recognition that silent reading is distinct from and more important than oral reading. A second evidence of progress lies in the fact that the aims and objectives of silent reading have been much more clearly formulated. A further important evidence of progress is shown in the development of tests and scales to measure various aspects of silent reading. To grasp the significance of the problem undertaken in this dissertation it is necessary to review briefly the facts with regard to the last two points mentioned above.

AIMS OF INSTRUCTION IN SILENT READING

The aims and objectives of instruction in silent reading are probably best summarized and most clearly stated in the Report of the National Committee¹ on Reading. In this report the aims of reading are stated as follows:

"The primary purpose of reading in school is to extend the experience of boys and girls, to stimulate their thinking powers, and to elevate their tastes. . . . A second objective is to develop strong motives for and permanent interests in reading that will inspire the present and future life of the reader and provide for the wholesome use of leisure time. . . . A third aim of reading instruction, therefore, is to develop the attitudes, habits, and skills that are essential in the various types of reading activity in which children and adults should engage. (This includes):

1. Habits common to most reading situations—
 - a. Recognition of sentences as units.
 - b. Recognition of words or groups of words.
 - c. Recognition of typographical devices.
 - d. Holding book properly, etc.
2. Habits of intelligent interpretation—
 - a. In the simpler types of reading . . .
 - b. In the more complex types of reading—
 - (1) Analyzing or selecting meanings.
 - (2) Associating or organizing meanings.
 - (3) Evaluating meanings.
 - (4) Retaining meanings.

. . . . One of the requirements of good interpretation is the recognition of the purpose of reading and the use of appropriate habits. It is essential, therefore, that instruction provide training in reading numerous types of

¹Twenty-Fourth Yearbook, National Society for the Study of Education, Part I, *Report of the National Committee on Reading* (Bloomington, Illinois: Public School Publishing Co., 1925), pp. 1-73.

material for various purposes until appropriate habits and reading procedures have been fully established."

The third major aim in reading instruction of the "development of the attitudes, habits, and skills that are essential in the various types of reading activity in which children and adults should engage" may be further simplified if the specific objectives involved are stated as follows:

1. The development of speed in reading.
2. The development of a rich, meaningful vocabulary.
3. The development of habits of intelligent interpretation in various silent reading situations according to the purpose which the reader has in mind.

Obviously the extent to which the various aims of reading are realized is not always easily determined. It is quite clear, however, that it is possible, within certain limitations, to measure the extent to which the third major aim as outlined above is attained, especially when considering silent reading.

ASPECTS OF SILENT READING MEASURED BY EXISTING TESTS AND SCALES

The Kansas Silent Reading Test² is designed to give a single, combined measure of the rate of reading and the comprehension. Comprehension is indicated by the child's ability to respond effectively to silent reading situations varying in the activity and purpose involved. The type of activity and the purpose involved in the reading varies in haphazard fashion from exercise to exercise. The child may be asked to indicate his comprehension by solving the problem contained, following the directions given, or answering the fact questions about the material. The various exercises in the test vary in difficulty. The child's score on the test is the sum of the values attached to the various exercises to which he has responded correctly in the time allowed.

The Thorndike-McCall Reading Scale³ measures how difficult a paragraph a child can read silently and comprehend, when comprehension is defined as the ability to get the facts from the material read. The test is composed of a number of disconnected paragraphs of increasing difficulty. At the time of the construction of this test Thorndike worked upon the basis of the following definition: "Call achievement in paragraph reading that thing, much of which enables an individual to respond correctly to a paragraph and questions about a paragraph involving much difficulty, whereas an individual of less achievement could respond correctly to a paragraph and to questions about a paragraph of less difficulty."

The Starch Silent Reading Tests⁴ give measures of the rate of reading and the comprehension of continuous selections. In connection with these tests comprehension means the ability to reproduce the relevant words contained in the selections; the rate of reading is the average number of words read per second. The tests consist of a number of narrative selections of increasing difficulty. In administering the tests it is customary to give the child three selections in order to secure more accurate information regarding his ability.

Brown's Test of Silent Reading Ability⁵ measures the rate of reading and the

²Kelly, F. J., "The Kansas Silent Reading Test," *Journal of Education Psychology*, 7:63-80.

³Thorndike, E. L., "The Measurement of Ability in Reading," *Teachers College Record*, 15:207-277; 16:445-467; 17:40-67.

⁴Starch, Daniel, "The Measurement of Efficiency in Reading," *Journal of Educational Psychology*, 6:1-24.

⁵Brown, H. A., "The Measurement of Ability to Read," (Concord, New Hampshire: Department of Public Instruction, 1916), *Research Bulletin* 1:57.

comprehension of a continuous selection. Comprehension is indicated by the child's ability to reproduce the relevant ideas in the selection; the rate score is the average number of words read per minute. In actual practice, however, the rate and comprehension scores are combined to give a single index of reading ability.

The Courtis Test of Silent Reading⁶ measures the rate of reading and the comprehension of a continuous narrative selection. Comprehension is indicated by the child's ability to answer direct fact questions of approximately equal difficulty based upon the selection; the rate score is the average number of words read per minute. Three scores are available as a result of giving this test: the average number of words read per minute, the number of questions answered, and the "comprehension index" or the number of correct responses minus the number of incorrect responses divided by the number of correct responses. In administering the test the child is first asked to read through so much of the selection as he can in the time allowed; he then reads the story again in sections of a few lines each and attempts to answer the questions based upon the material. Courtis has defined the ability involved in this test as "getting the essential relations between the essential elements."

The Fordyce Tests of Silent Reading⁷ measure the rate of reading and the comprehension of a continuous selection. Comprehension here means the ability to recall answers to fact questions of varying difficulty based on the material; the rate score is the percentage of the entire selection read in the time allowed.

The Monroe Standardized Silent Reading Tests (Revised)⁸ give measures of rate and comprehension of disconnected paragraphs. In these tests comprehension means the ability to respond effectively to silent reading situations varying in the type of activity and purpose involved; the rate score includes the average number of words read per minute and the time taken for deliberation and response to the exercises. The tests are composed of a number of disconnected paragraphs of fairly uniform difficulty. After reading a paragraph through the child is asked to respond by answering fact questions based on the paragraph, showing a grasp of the total meaning of the paragraph, or, in certain cases, showing an understanding of a literary expression or analogy. The comprehension score is the number of correct responses made in the time given.

The Burgess Silent Reading Test⁹ gives a measure of the child's ability to read silently and follow directions contained in the paragraphs. The child indicates his comprehension of a paragraph by making some simple drawing called for. The score is the number of correct responses made in the time given. The various paragraphs are approximately equal in difficulty.

The Woody Silent Reading Test¹⁰ determines how difficult a paragraph a child can comprehend as indicated by his ability to find the central thought of the paragraph. The child is asked to respond to his reading of a paragraph by selecting the statement following it which best tells the central thought. The score is the number of correct responses made. The test is composed of a number of disconnected paragraphs of increasing difficulty.

⁶Courtis, S. A., *Silent Reading Test No. 2*, (Detroit: Courtis Standard Tests).

⁷Fordyce, Charles, "A Scale for Measuring Achievement in Reading," (Lincoln, Nebraska: University Publishing Co.)

⁸Monroe, W. S., "Monroe's Standardized Silent Reading Tests," *Journal of Educational Psychology*, 9:303-312.

⁹Burgess, M. A., *The Measurement of Silent Reading*, (New York: Russell Sage Foundation, 1921), p. 163.

¹⁰Woody, Clifford, "Measurement of a New Phase of Reading," *Journal of Educational Research*, 8:315-326.

The Chapman-Cook Speed of Reading Cross-Out Test¹¹ measures the child's ability to read silently and grasp the total meaning of paragraphs. The child responds to a paragraph by crossing out a word contained therein which spoils the total meaning. The score is the number of correct responses made. The test consists of a number of disconnected paragraphs of approximately equal difficulty.

The Stone Series of Narrative Reading Tests¹² measure the rate of reading and the comprehension of continuous selections. In these tests comprehension is indicated by the ability to recall answers to fact questions based upon material; the rate score is the average number of words read per minute. The child first reads through the entire selection and then attempts to answer the questions of varying difficulty based upon it. The tests use narrative selections appropriate to the grades tested.

The Haggerty Reading Examination Sigma I for Grade I to III¹³ measures the child's ability to read silently and comprehend sentences and paragraphs of increasing difficulty. The examination is made up in two parts. Part I consists of a series of paragraphs of increasing difficulty which the child is asked to read and make responses to, usually, by carrying out some simple direction contained. The score is the number of correct responses made. Part II consists of a series of sentences in the form of direct questions of increasing difficulty. The child answers the questions on the bases of his understanding them and of his general informational background. The score is the number of correct responses minus the number of incorrect responses.

The Haggerty Reading Examination Sigma III for Grades V to XII¹⁴ determines how difficult a word a child can define, how difficult a sentence he can understand, and how difficult a paragraph he can comprehend. The examination is made up in three parts. Part I is composed of a series of exercises of increasing difficulty in which the child is asked to indicate his knowledge of the meaning of a word by underlining its synonym. The score is the number of correct responses. Part II consists of a series of sentences of increasing difficulty having the same characteristics as those described under Part II of Haggerty Reading Examination Sigma I. Part III consists of a number of disconnected paragraphs, the comprehension of which the child is asked to indicate by answering fact questions about the material, showing a grasp of the total meaning, or explaining a literary expression or analogy. These various types of reading activity are not presented according to any logical plan. The score is twice the number of correct responses. There is also a total score which is the sum of the scores on the separate tests.

The Reading Examination of the Stanford Achievement Tests¹⁵ measures how difficult a word a child can define, how difficult a sentence he can understand, and how difficult a paragraph he can comprehend. The examination consists of three parts. Part I is composed of a series of paragraphs of increasing difficulty, the comprehension of which the child indicates by supplying

¹¹Chapman, J. C. and Cook, Seida, "Principle of the Single Variable in the Speed of Reading Cross-Out Tests," *Journal of Educational Research*, 8:389-396.

¹²Stone, C. R., "Recent Developments in Silent Reading Tests," *Journal of Educational Research*, 6:102-115.

¹³Haggerty, M. E. and Noonan, M. E., *Achievement Examination in Reading Sigma I* (Chicago: World Book Company, 1920).

¹⁴Haggerty, M. E., "The Ability to Read: Its Measurement and Some Factors Conditioning It," (Bloomington: Indiana University Studies, 1917), No. 34, p. 63.

¹⁵Kelley, T. L., Ruch, G. M., and Terman, L. M., *Stanford Achievement Tests*, (New York: World Book Company, 1922).

the words necessary to complete the total meaning. The score is the number right times two. Part II consists of a series of sentences having the same characteristics as those described under Part II of the Haggerty Reading Examination Sigma I. The score in this part is the number of correct responses minus the number of incorrect responses. Part III consists of a series of exercises of increasing difficulty to each of which the child is asked to respond by underlining that word which properly shows the use of another word in a sentence. The score on the test is the number of correct responses. There is also a total score on these tests which is the sum of the scores on the three taken separately.

The Thorndike Visual Vocabulary Test¹⁶ measures how difficult a series of words a child can define as indicated by his ability to classify them in their proper families. The test uses twelve different series of words, each series increasing in difficulty. The child's score on the test is given in terms of the difficulty of the series of words to which he can correctly respond with no more than one error or omission.

The Thorndike Test of Word Knowledge¹⁷ determines how difficult a word a child can define as indicated by his ability to select its synonym. The test is composed of a series of words selected from the Teacher's Word Book and arranged in order of their decreasing frequency in the child's reading materials. The child selects the synonym of a word from a list of five words which follow it. The score is the number of correct responses.

Greene's Organization Test¹⁸ measures the efficiency with which a child can organize a series of disarranged words or phrases into a logical sentence. The child indicates the correct order of the disarranged words or phrases by listing the number of the word or phrase which should come first, second, and so on. The exercises are arranged in order of increasing difficulty. The score is determined by the difficulty of the exercise to which the child can correctly respond.

A few other tests have sometimes been used in connection with the measurement of achievement in silent reading. To describe them would be to duplicate what has been said or to classify as a silent reading test one that was never so intended.

PRESENT SITUATION WITH REGARD TO MEASURING ACHIEVEMENT IN SILENT READING

An analysis of the facts found in this brief review of existing tests and scales in silent reading shows that various attempts have been made to measure the following aspects or phases of the process:

1. The rate of silent reading of—
 - a. Continuous selections.
 - b. Disconnected paragraphs.
2. The silent reading vocabulary by—
 - a. Selecting the synonym of a word.
 - b. Recognizing the proper use of a word in a sentence.

¹⁶Thorndike, E. L., "Measurement of Achievement in Reading: Word Knowledge," *Teachers College Record*, 17:430-454.

¹⁷Thorndike, E. L. and Symonds, P. M., "Derivation, Reliability, and Grade Achievements in a Test of English Vocabulary," *Teachers College Record*, 17:430-454.

¹⁸Greene, H. A., "Tests for the Measurement of Certain Phases of Linguistic Organization," *Journal of Educational Psychology*, 11:517-525.

3. The comprehension of material read silently involving the following activities and purposes—
- a. Reproducing the ideas or words contained.
 - b. Answering fact questions about the material either with or without re-reading.
 - c. Following directions contained.
 - d. Grasping the total meaning of paragraphs.
 - e. Finding the central thought of paragraphs.
 - f. Organizing disarranged words or phrases.
 - g. Answering simple and involved questions on the basis of general informational background.

It must be clear that the above summary of measuring devices in silent reading represents a great deal of overlapping and duplication in effort on the part of the test constructors. Furthermore, no existing battery of tests attempts to measure more than three aspects or phases of silent reading.

The situation in measurement as regards silent reading means either (a) that many or none of the tests are measuring silent reading or (b) that silent reading consists of a very complex set of activities and existing tests are measuring only certain very different aspects of the complex whole. The author accepts the second point of view, and to this he shall hold in giving an account of the present investigation.

To the practical administrator of silent reading tests, however, this situation presents a very serious and well nigh insurmountable problem. He must decide either to test only certain phases of silent reading or he must attempt to select a number of tests of silent reading constructed by different authors and involving much duplication and little unity of purpose or method of attack.

This problem is stated by Monroe, DeVoss, and Kelly¹⁹ as follows: "If we are correct in our thesis that there are several types of silent reading, it is necessary to have in mind that a single test probably measures only one type of silent reading ability. . . . A survey of existing tests indicates that we have satisfactory ones for only a few of the types of silent reading. Hence, it is not now possible to secure a complete diagnosis of pupils with respect to the ability to read silently." C. T. Cray²⁰ makes the following statements relative to this problem: "There are certain difficulties which are met in applying any method by which reading ability is to be measured. . . . A third difficulty grows out of the fact that reading is an exceedingly complex process. For this reason, it is very difficult to devise a single test by means of which, alone, this highly complex process can be measured. If the reading ability of an individual pupil is to be investigated in its entirety, different tests, each of which measures a different phase of reading activity, must be used. . . . It becomes necessary, then, to select a series of tests from those which are available. In making such a selection the investigator must bear in mind that no reading test has been devised especially for the purpose of diagnosis."

THE PROBLEM

This situation, then, gives rise to the specific problem undertaken in the present study, viz., *to construct, refine, and standardize a unified group of tests of achievement in silent reading which will more adequately meet the needs for*

¹⁹Monroe, W. S., DeVoss, J. C. and Kelly, F. J., *Educational Tests and Measurements (Revised)*, (Chicago: Houghton Mifflin Company, 1924).

²⁰Gray, C. T., *Deficiencies in Reading Ability*, (D. C. Heath & Co., 1922).

complete measurement of silent reading ability and which will more specifically measure efficiency in the various silent reading activities in which the child should engage. Since an attempt to solve this problem for all stages of the development of silent reading ability would be too great an undertaking, the problem will be delimited to a consideration of those stages represented in the school grades IV to VIII, inclusive.

The specific undertakings involved in the solution of this problem are:

1. Selection of important phases of silent reading to be measured.
2. Construction of a series of tests measuring the important phases under the most natural conditions.
3. Determination of the validity of the tests.
4. Determination of the relative predictive values of the tests.
5. Determination of the reliability of the tests and the equivalence of alternate test forms.
6. The establishment of norms of achievement in the tests.
7. Demonstration of the utility of the tests.

DEFINITION OF SILENT READING ABILITY

In connection with this dissertation silent reading ability is defined as follows: *Ability to read silently is that ability which enables an individual to respond effectively to various types of silent reading situations.* Obviously an individual with much of this ability will respond more effectively in a variety of silent reading situations involving various materials and purposes than one possessing a lesser amount of the ability. It is clear that, according to this definition, silent reading is conceived to be an exceedingly complex process. Completely satisfactory silent reading involves good habits of eye movement, rapid perception of visual symbols, ready recognition of word meanings, and intelligent interpretation of phrases, sentences, paragraphs, and selections according to the purpose which the reader has in mind. Completely satisfactory silent reading involves perception, association and memory and, in its advanced stages, judgment and reason. It is by no means independent of the maturity, training, and intelligence of the individual.

Two objections to the above definition of silent reading ability may be enumerated here. First it is held, that in defining reading ability, one should confine himself to that which, alone, is essential in all types of reading activity. Courtis²¹, for example, recognizes two aspects of reading—the purposeful or thought-getting and control over the mechanism by which thought is obtained. But, since control over the mechanism is essential to all types of reading activity, he proposes to define reading as “the degree of control possessed by the child over the reading mechanism, or the excellence of the mechanism itself.” Otis²² makes the statement: “It would seem to me, then, that reading ability, to be logically defined, must be considered as embodying in essence only those mental processes which are concerned in reality with the specific visual symbols as such. Other mental activities involved in the total reading complex may be spoken of as ‘supra-reading’ or accompaniments of the process.”

The second objection to the definition of silent reading ability accepted in this dissertation is that it does not appear to conform to the “factor concept” in

²¹Courtis, S. A., “Analysis of Reading Ability,” *Journal of Educational Research*, 4:287-293.

²²Otis, A. S., “Consideration Concerning the Making of a Scale for the Measurement of Reading,” *Pedagogical Seminary*, 23:528-549.

education. For example, if maturity, training, and intelligence may be considered as "factors," then silent reading ability as here defined could not be spoken of as a unique factor. On the contrary, in measuring silent reading ability, as here defined, the scores would be influenced by such things as the maturity, training, and intelligence of the individual.

Investigations of silent reading and silent reading ability from the points of view noted in these objections would be interesting and worth while. In the present investigation, however, it has seemed best (1) to proceed upon an assumption best justified by generally accepted aims and practices in silent reading, and (2) to disregard, for present purposes, the primal causes of achievement in silent reading.

PHASES OF SILENT READING FOR WHICH MEASURES ARE PROPOSED IN THIS DISSERTATION

To make more specific the plan of measurement of silent reading proposed in this dissertation, there is listed below the phases of the process which have received consideration.

1. The rate of silent reading.
2. The knowledge of word meanings.
3. The interpretation of materials read in a variety of clearly distinguished silent reading situations. Specifically these situations are:
 - a. Reading to get the facts from paragraphs.
 - b. Reading to follow directions.
 - c. Reading to grasp total meaning of paragraphs.
 - d. Reading to find the central thoughts of paragraphs.
 - e. Reading to make a logical organization of paragraphs.

At this stage of the investigation the reader is asked to consider the following points in defense of the plan of measurement outlined above: (1) the aims of silent reading as previously summarized, (2) the nature of the limitations placed upon the problem undertaken in this investigation, (3) the accepted definition of silent reading ability, (4) the impracticability of measuring too many phases of the process, and (5) the difficulty of measuring certain aspects of silent reading without involving much of other abilities than those essential to the process itself. In the chapter which follows a further attempt will be made to justify the selection for measurement of those phases of silent reading listed above.

CHAPTER II

CONSTRUCTION OF THE TESTS

CRITERIA OF A GOOD TEST

There are certain generally accepted criteria* which must be considered in the construction, refinement, and standardization of any educational test. In order that the reader may have these in mind throughout the reading of this dissertation the following outline, as a partial explanation of their significance, is presented:

1. *Validity of significance*, or the extent to which the test measures a significant phase of the process under consideration.
2. *Validity*, or the degree to which the test measures that which it purports to measure.
3. *Reliability*, or the degree to which the test measures the same ability at different times.
4. *Objectivity*, or the extent to which the personal element is eliminated in the test results.
5. *Utility*, or the degree to which the test is usable in connection with school instruction.

In order to further guide the reader in considering the following account of how the various silent reading tests were constructed, there is listed below some of the more general principles which were taken into account in undertaking this phase of the problem.

1. The selection of materials and situations in silent reading typical of those which the child encounters in life in and out of school.
2. The selection for measurement of significant aspects or phases of the silent reading process, so far as may be judged from accepted aims and objectives.
3. The employment of a vocabulary in the tests suitable to the grades under consideration.
4. Elimination, so far as possible, of the exercise of other abilities than those essential to making effective responses in various silent reading situations.
5. The measurement of efficiency of the child at a given level of difficulty in the various silent reading situations. (This excepts the Word Meaning test.)
6. The development of objective methods of scoring.
7. The preparation of clear instructions.
8. The preparation of alternate test forms.

*The reader is referred to the following authorities:

²³Monroe, W. S., *The Theory of Educational Measurements*, (New York: Houghton Mifflin Company, 1923).

²⁴McCall, William, *How to Measure in Education*, (New York: The MacMillan Company, 1923).

PRELIMINARY INVESTIGATION

In the following account of how the tests were constructed reference will be made from time to time to a "preliminary investigation" conducted during the years 1923-1925. This preliminary investigation consisted in: (1) submitting the tests in mimeographed form to about 75 second year students of Western State Normal, Kalamazoo, Michigan to detect crude deficiencies; (2) giving both forms of the tests to about 3000 school children* in grades IV to VIII, inclusive, to discover other less obvious defects, to determine the difficulty of test elements, to develop objective methods of scoring, and to secure certain approximations as to proper time allowances, validity, reliability, and utility; (3) submitting the tests to groups of experienced teachers, school administrators, and professional educators to secure their criticisms and suggestions.

TEST I: WORD MEANING

A number of studies^{1 25 26} in addition to those to which reference has already been made have shown the importance of a rich, meaningful vocabulary for satisfactory achievement in silent reading. Hilliard, for example, has shown that, barring intelligence, no other factor has so much influence upon the ability to comprehend material read silently as the child's vocabulary. Test I, WORD MEANING, was constructed for the purpose of determining how well children can select the meanings of words of increasing difficulty.

The words which are to be defined in this test were selected from "The Teacher's Word Book" by E. L. Thorndike.²⁷ The selection of these words may be described as follows: If it was desired to select a word with a count of 90-99, the Word Book was opened to a random page, and the first word appearing on that page with the desired count was selected for use. The same procedure was followed for the selection of the word with the next desired count, and so on. With this method of selection two alternative forms of the test were constructed with the words according to the following plan:

2 words with a count of 90-99	2 words with a count of 20-24
2 words with a count of 80-89	2 words with a count of 15-19
2 words with a count of 70-79	2 words with a count of 10-14
2 words with a count of 60-69	2 words with a count of 9
2 words with a count of 50-59	2 words with a count of 8
2 words with a count of 45-49	2 words with a count of 7
2 words with a count of 40-44	2 words with a count of 6
2 words with a count of 35-39	2 words with a count of 5
2 words with a count of 30-34	2 words with a count of 4
2 words with a count of 25-29	2 words with a count of 3

The method of indicating the meaning of each word selected is shown in the following section of the test:

*The following Michigan schools co-operated in this preliminary investigation: Albion, Hastings, Zeeland, Paw Paw, Bloomingdale, Kalamazoo, Kalamazoo Normal Training.
¹*Twenty-Fourth Yearbook of the National Society for the Study of Education, Part I*, pp. 75-96.

²⁵Dickinson, Dick, "The Importance of Vocabulary in Reading," *Elementary School Journal*, 20:537-546.

²⁶Hilliard, G. H., "Probable Types of Difficulties Underlying Low Scores in Comprehension Tests," *University of Iowa Studies in Education*, II, No. 6.

²⁷Thorndike, E. L., *The Teachers' Word Book*, (New York: Teachers College Publications, Columbia University, 1921).

DIRECTIONS

"On the next page are such exercises as:

To be weary is to be *tired* lazy dull quick

Here the word which completes the meaning of the sentence or makes it true is 'tired,' so a line is drawn under tired. The sentence now reads, 'To be weary is to be tired.' In each exercise on the next page there is a choice of four words or groups of words, but only one completes the meaning of the sentence or makes it true. Draw a line under that word which makes the sentence true as shown in the sample. Work as rapidly as you can, being sure to do them right. Do not start until you are told, and, when you are told to stop, you must stop at once. Turn. Go!

1. A dress is something to drink eat wear throw
2. A letter comes in the water air store mail
- ...
39. A mediator is on who invents lectures etc,
40. Chronicle is a kind of a disease poetry etc."

In selecting the four words from which one is to be chosen as indicating the proper meaning, two practices were observed. First, all four words were to be of the same part of speech in order to minimize the exercise of linguistic ability. Second, all four words were to have a count as great as or greater than that of the word to be defined. This was done to decrease the possibility of having the word which defines less likely to be in the child's vocabulary than the word to be defined.

As a result of the preliminary investigation changes were made to eliminate the following defects in the test: (1) unreasonable definitions of words, (2) more than one possible meaning of the word in the four choices listed, (3) poorly constructed sentences, (4) irregular progression in the difficulty of the exercises. Table A of the appendix gives the Thorndike count, the per cent failing, and the P. E. values for the various exercises of the test. This table shows that, as now arranged, the exercises progress in difficulty from a P. E. value of -2.8 to 1.0. It was decided, on the basis of the results of the preliminary investigation, to score the test in terms of the number of correct responses and to allow 3 minutes for the child to work upon it.

TEST II: RATE

No extensive investigation is necessary to demonstrate the importance of speed for efficiency in any useful habit or skill. This is as true of the skills and habits to be developed in silent reading as it is in any other school subjects. The primary purpose of Test II, RATE, is to determine how rapidly children read silently a continuous selection of fact material.

The selections* chosen for this test are "Is It Lead In Your Pencil?" for Form I and "How Did The Indians Send Messages?" for Form II. These selections are used because, in addition to meeting the general principles stated at the beginning of the chapter, they contain many facts which are clearly stated. The method of determining the rate of reading is seen in the following section taken from Form I of the test:

*Courtesy of J. B. Lippincott Company, Chicago.

DIRECTIONS

"This is a test to see how well you can read silently. When I say, Go, begin to read the story on the next page. Read silently and only as fast as you can understand what you read, for you will be asked questions about the story when you are through. You will be marked on how much you read and how well you answer questions about the story. Every minute I will say, Mark! When I say, Mark, draw a line around the word you are reading, and keep right on reading. If you should finish before I say, Stop, lay aside your paper and wait until the rest have finished. Turn. Go!

'Is it Lead in your Pencil?'

The lead in your pencil is not made of lead.	10
Long ago people had lead in their pencils ;	18
that is probably why the pencils we use are	27
called lead pencils. Now another mineral	33
called graphite is used.	
they are put into small blocks of wood and	412
made into pencils."	415

As a result of the preliminary investigation it was found that there are two objections to having the child mark the word he is reading more often than once every minute. First, when a child finds that he is reading slowly, he speeds up to complete the selection and raise his score. Second, when a child is compelled to mark his place of reading at all there is an interference with continuous, connecting reading. Largely for these reasons it was decided to have the child mark the word he is reading only at the end of every minute and to take the number of words read during the first minute as representing his most natural rate. It was also decided to allow 3 minutes for the test. About 75 per cent of the children in grades IV to VIII are able to read the entire selection in the time allowed.

TEST III: FACT MATERIAL

One of the most important purposes for which children and adults read is to get the facts.²⁸ One of the most universal evidences that an individual has comprehended what he has read is that he is able to indicate a knowledge of the facts contained in the material. With this in mind, Test III, FACT MATERIAL, was constructed for the purpose of determining how well children get the facts from what they read.

The material for this test is based upon the selections presented in Test II, RATE. For Test III the selections were broken up into short paragraphs with questions following each paragraph.

This was done to allow re-reading and to eliminate excessive influence of memory. The method of measuring the child's efficiency in this type of silent reading activity appears in the following section of the test:

DIRECTIONS

"Below you will find a paragraph of a story about a Chinese boy. Under the paragraph are some questions about it which can each be answered

²⁸Gray, W. S., "The Importance of Intelligent Silent Reading," *Elementary School Journal*, 24:348-366.

by one or more words given in the paragraph. Read the paragraph and then write after each question the word or words which correctly answer it. If necessary, re-read the paragraph before attempting to answer the questions.

'Bud was a Chinese boy. His father had named him Bud because it meant something that grows; a bud grows to be a flower. The boy's father hoped that his son would become a wise man, and hold a high office in China, his beloved country.'

1. What kind of a boy is the story about?-----
2. What is the boy's name?-----
3. What did the boy's father want him to become?-----
4. Where did Bud live?-----

"On the following pages you will find paragraphs and questions to be answered about the story which you just read a short time ago. Answer as many questions as you can in the time allowed, being sure to get the answers right. If you do not remember what the story said, read the paragraph just above the questions again and again, until you find the correct answer. Turn. Go!

'The lead in your pencil is not made of lead. Long ago people had lead in their pencils; that is probably why the pencils we just like coal or iron ore.'

1. What did people use in their pencils long ago?-----
2. What mineral is used in the pencils now?-----

'As soon as a tray is filled with pieces, it is sprinkled with a dust called "carbon dust" of wood and made into pencils.'

17. With what are the pieces of lead sprinkled?-----
20. Into what are the dry pieces of lead put?-----"

On the basis of results from the preliminary investigation changes were made to eliminate the following defects in the test: (1) ambiguous questions, (2) questions with several possible answers, (3) unequal difficulties of questions. Table B of the appendix gives the per cent failing and the P. E. values of the 20 questions retained in each form of the test. This table shows that the various exercises range in P. E. values from —1.9 to —2.6. It was also decided to allow 3 minutes for the test and to score it in terms of the number of correct responses.

TEST IV: FOLLOWING DIRECTIONS

Another purpose for which children and adults read is to determine how to act in different situations.^{28, 29} An individual gives evidence of having comprehended certain paragraphs or selections which he has read when he is able to follow the directions contained therein. The purpose of Test IV, FOLLOWING DIRECTIONS, is to measure the effectiveness with which children can read silently and follow directions.

This test was prepared from a series of disconnected paragraphs composed by the author. The author composed these paragraphs because of the great difficulty of finding paragraphs in the child's daily reading materials containing direc-

²⁸Gray, W. S., "The Importance of Intelligent Silent Reading," *Elementary School Journal*, 24:348-356.

²⁹Gray, W. S., "The Relation Between Reading and Study," *National Education Association: Addresses and Proceedings*, 57:580-586.

tions which could be carried out under practical testing conditions. The materials used, therefore, are not entirely typical of those which the child encounters, although the situations are analogous. The method of measuring the phase of silent reading under consideration is shown in the following section of the test:

DIRECTIONS

"This is a test to see how quickly and accurately pupils can read silently and follow directions. To show what sort of a test it is let us read this:

'Below are the names of four children. Draw a line around the word which is not the name of a girl.'

Mary John Kate Ann

"This exercise tells us to draw a line around the word, John. Even a line drawn under the word, John, would be wrong. On the next page are a lot of exercises of this sort. Study each exercise carefully until you are sure that you know exactly what you are asked to do. Do not start until told, and be sure to stop as soon as I say, Stop. Turn. Go!

1. Mary was sent to the store by her mother to buy a dozen oranges. On her way home she became hungry and ate one of the oranges. Then she had only eleven. On the line below write the word, one, to tell how many oranges Mary ate on her way home from the store.

10. Mary said the other day that when she was old enough she was going to be a teacher. But Mary is only ten years old. She will not be able to teach for eight years yet. She will then be eighteen years old. Draw a circle around the figure right below to tell how many years it will be before Mary can teach school.

9 18 8 10 3

On the basis of the results of the preliminary investigation it was possible to eliminate the following defects in this test: (1) too complicated responses, (2) confusing directions, (3) extreme variations in the difficulty of the test elements. Table C of the appendix gives the per cent failing and the P. E. values for the exercises retained in each form of the test. This table shows that the test elements vary in difficulty from P. E. values of —1.3 to those of —2.0. The time to be allowed for the test is 3 minutes, and the score is the number of correct responses.

TEST V: TOTAL MEANING

Much of the child's silent reading is for the purpose of grasping the total or essential meanings of paragraphs.^{1, 29} For example, he reads descriptive accounts of scenes, experiences, and circumstances for the purpose of getting a single total impression of the accounts. Test V, TOTAL MEANING, is designed to determine how rapidly and accurately children can read silently and grasp the total meanings of the paragraphs read.

This test is composed of a number of short, disconnected paragraphs selected from the reading materials of the grades under consideration.* The following section of the test gives an idea of the method by which the effectiveness of the child's responses to this silent reading situation is determined:

¹*Twenty-Fourth Yearbook of the National Society for the Study of Education, Part I, pp. 1-73.*

²⁹*National Education Association: Addresses and Proceedings, 57:580-586.*

*The sources of materials for this and other constructed tests appear in the appendix.

DIRECTIONS

"Below is an exercise in silent reading. Read the exercise and then draw a line under the one of the four words given beneath the exercise which correctly answers the question asked.

"Read the following exercise:

'The sun is warm and bright this morning. The birds are beginning to come back from the South, and the buds are coming out on the trees and bushes.' What season of the year is it?

autumn spring summer winter

"On the following pages are a number of exercises like this to be done. When I say, Go, begin work. Work rapidly, but remember that your answers must be correct. Remember to draw a line under only one word in each exercise. Turn. Go!

12. For days he kept listening and waiting for someone. Every bit of rock that fell and every rustle of the breeze made him look for a coming foot-step. But all that came were morning and evening. How must the boy have felt?

lonely idle good pleasant

The following defects in the test were eliminated as a result of the preliminary investigation: (1) paragraphs of uncertain total meaning, (2) paragraphs with more than one possible total meaning, (3) extreme variations in the difficulty of the test elements. Table D of the appendix gives the per cent failing and the P. E. values for the exercises retained in each form of the test. This table shows that the elements vary in difficulty from P. E. values of -1.8 to those of -2.4 . The test is scored in terms of the number of correct responses, and the time allowance is 2 minutes.

TEST VI: CENTRAL THOUGHT

Recent studies^{28, 30} show that another important purpose for which children read is to get the author's central thought or leading idea. Much of the child's most intelligent interpretations consist in identifying the leading ideas of paragraphs read. Test VI, CENTRAL THOUGHT, is intended to determine how effectively children can read silently and find the central thought of the paragraphs read.

This test uses a number of disconnected paragraphs selected from reading materials of the grades under consideration. The nature of the test is apparent from a consideration of the following section of the test:

DIRECTIONS

"On the following pages are some short paragraphs. After each one you will find four statements or sentences. Each statement tells something about the paragraph. You are to pick out the statement or sentence that you think tells best what the central or most important thought is.

"Here is a paragraph for practice. Read it carefully and then read the statements that follow. Draw a circle around the letter before the statement

²⁸Gray, W. S., "The Importance of Intelligent Silent Reading," *Elementary School Journal*, 24:348-356.

³⁰Hill, H. C. and Lyman, R. L., *Reading and Living Book One*, (New York: Charles Scribners Sons, 1924), pp. x-xiii.

or sentence that you think best tells the central or most important thought. Work carefully as you will have plenty of time.

'A farmer once caught a bird in a net. The bird begged the farmer to let him go free, promising that he would lead many other birds to the net. But the farmer said, "Now that I know the kind of a bird you are you shall surely die. No death is too bad for him who is ready to betray his friends."'

- a. The bird asked the farmer to let him go free.
- b. The bird was told that he must die.
- c. The bird learned that it was wrong to betray his friends.
- d. The bird was caught in a net by the farmer.

"On the next page you will find some more paragraphs like the one you have just finished. You are to read these carefully and draw a circle around the letter before that statement below the paragraph which you think best tells the central or most important thought. Be sure to draw a circle around the letter before only one statement under each paragraph. Turn. Go!" (Then follows a series of exercises of the sort illustrated above).

The results of the preliminary investigation made it possible to eliminate the following defects in the test: (1) paragraphs of uncertain central thought, (2) statements from which more than one might be selected as a satisfactory central thought, (3) extreme variations in the difficulty of the various exercises. Table E of the appendix gives the per cent failing and the P. E. values for the exercises retained in each form of the test. This table shows that the P. E. values for the various exercises range from 0.0 to —.3. The time allowance decided upon for the test is 5 minutes; the score is the number of correct responses.

TEST VII: ORGANIZATION

Several authorities^{1, 31} in the field of silent reading have pointed to the necessity of recognizing the importance of making a logical organization of the materials read as a purpose in silent reading. In those cases of the silent reading of materials which deal with historical accounts, narrative selections, and scientific expositions, for instance, not infrequently the best evidence that an individual has comprehended is that he is able to relate or identify the important ideas in the logical order presented by the author. Test VII, ORGANIZATION, was constructed with the purpose of securing a measure of the efficiency with which children can read silently and organize the material read.

The test was prepared from a series of paragraphs or groups of paragraphs selected from the child's daily reading materials. The following portion of the test will show the method of measuring the phase of silent reading under consideration:

DIRECTIONS

"On the following pages are some paragraphs which you will be asked to read through carefully once. After having read a paragraph or set of paragraphs through you are to turn to the next page and show the order in which the ideas listed there were given in the paragraphs read. Show the proper order by putting the figure one before the idea that came first, two

¹Twenty-Fourth Yearbook of the National Society for the Study of Education, Part I, pp. 1-73.

³¹Horn, Ernest, "A Constructive Program in Silent Reading," *Journal of Educational Research*, 3:336-344.

before the idea that came second, three before the idea that came third, and four before the idea that came fourth.

"Here is a paragraph for practice. Read it through once and then turn to the next page, and show the order in which the ideas given occurred in the paragraphs.

Cork Trees

'The Spanish summer is so hot and dry that farmers cannot grow corn for hogs as we do in the United States, or potatoes as they do in Poland and Germany. Therefore, most of the Spanish pigs are fattened on acorns in the large forests of cork oak trees.

'Most of the cork used in every country of the world comes from Spain and Portugal. Cork is the soft bark of a certain oak tree. The owners of the cork forests strip the bark from the trees every nine or ten years. Then it is packed up in bundles, which are put on the backs of donkeys and mules and carried long distances to the railroads. Spain does not have as many railroads as does France or Germany, and as most of the country roads are bad, much of the freight is carried on the backs of donkeys and mules rather than in wagons.' (Turn to the next page)

-----Spanish summers are too hot and dry to raise corn and potatoes.

-----Spain does not have as many railroads as France or Germany.

-----Most of the cork used in the world comes from Spain and Portugal.

-----Cork bark is stripped from the trees every nine or ten years.

"Stop here!

"Now there will be some more of the same kind. Do not start until you are told. You can read through each set of paragraphs just once. After you have turned the page, you cannot turn back. Ready. Go!" (Then follows sets of paragraphs as illustrated above).

On the basis of the results of the preliminary investigation the following defects were eliminated from the test: (1) paragraphs containing confusing arrangement of the important ideas, (2) inadequate method of scoring, (3) extreme variations in the difficulty of the various exercises. Table F of the appendix presents the per cent of misplacements of the various statements together with the derived P. E. values. This table shows that the items remaining in the test have P. E. values ranging from $-.4$ to 0.0 . After trials with various methods of scoring, it was decided that best results were secured when the test is scored in the terms of the extent of misplacement of the various statements. The time allowance is 5 minutes.

THE TOTAL BATTERY OF TESTS

Complete copies of all the constructed tests appear in the appendix. In the appendix will also be found a brief set of instructions given to teachers and pupils previous to the administration of the total series of tests. A total score in silent reading is secured by totalling all the separate scores as they appear with the exception of the score in Test II, RATE. In the total score the number of words read during the first minute in the Rate test is divided by ten. In the chapters which follow the total score will be called the Composite score with arbitrary weightings.

POSSIBLE LIMITATIONS OF THE TESTS

In order to clarify the position of the author and to avoid misleading the reader, it is well to suggest here certain possible limitations of the tests which appear in their construction.

The Word Meaning test cannot be expected to give a complete index of the total silent reading vocabulary of the child, inasmuch as it tests the child on only 40 words, and does not cover the range beyond the 10,000 most common. It may correlate highly with the total vocabulary, however, and it is this that is desired. It must also be remembered that it would require a very elaborate investigation to determine whether the ability to select word meanings as required in this test is perfectly correlated with the child's ability to use the words in sentences, or to construct definitions, or to get the meanings in different context.

The Rate test measures rate of reading under one set of conditions. It is now well known that a child's rate of reading varies with the type of activity involved and the purpose of his reading.

The Fact Material test presents the difficulty of maintaining a constant method of work among the pupils taking the test. One child may re-read the entire paragraphs while another only reads so much as will answer the questions he finds below the paragraphs. Very likely, however, the second reader may be considered the more efficient, and the feature of the test just described is, therefore, desirable. As a matter of fact, our particular interest is in the response made rather than in the method of making the response.

The silent reading situations presented to the child in the test of Following Directions are not entirely typical of those which the child encounters in school and out. One should carry out an extended investigation to determine whether these semi-artificial situations bring about responses which correlate highly with the more natural and complicated ones which he typically makes.

While the material for use in the Central Thought test was selected from the readings of the lower grades considered in this study, too many children find the exercises difficult. This is evidenced by the fact that, on the average, nearly 50 per cent of the pupils make incorrect responses to each exercise. This apparent limitation may be entirely due to lack of instructional emphasis.

Concerning the Organization test it may be said that in actual practice the child may be allowed several readings of a set of paragraphs before being asked to make a logical organization of the ideas contained in them. Practical testing conditions, however, limit the possibility of securing a measure in this way. The child can, therefore, read the paragraphs through but once.

In general, it must be recalled that in this series of tests the child's efficiency is being measured at a given level of difficulty. The results of these tests will not show to how difficult silent reading situations the child can correctly respond.

This list of limitations is pointed out, not with the idea of stressing the inadequacies of the present tests, but with the idea of expressing awareness of the fact that many additional problems of silent reading have presented themselves during the course of this investigation. These additional problems must be temporarily overlooked, due to the practical considerations of time and purpose in the present dissertation.

CHAPTER III

STATISTICAL DATA DEALING WITH THE EXTENT TO WHICH THE TESTS MEET THE ACCEPTED CRITERIA

VALIDITY OF THE TESTS

To secure data bearing upon the validity of the constructed tests the following tests were given to children in the public schools at Ypsilanti, Michigan, between October 23 and November 6, 1925:

Stanford Achievement Tests, Form B.
Thorndike-McCall Reading Scale, Form II.
Monroe Silent Reading Test (Revised), Form II.
Burgess Silent Reading Test, Form II.
Thorndike Word Knowledge Test, Form B.
Woody Silent Reading Test, Form II.
Series of Constructed Tests, Form I.

With the exception of the Stanford Achievement Tests, these tests have all been adequately described in previous chapters. In addition to the previous description of the reading tests of the Stanford Achievement series, it should be mentioned that they contain measures of arithmetic computation, arithmetic reasoning, knowledge of nature study and science, knowledge of history and literature, language usage, and spelling.

Table I gives a number of coefficients of correlation³² between scores on the constructed silent reading tests and the scores on other tests given to the Ypsilanti children. The table is made up in three parts: Part A dealing with the correlation between the separate tests constructed and tests measuring similar phases of silent reading; Part B, the correlation between the Composite of the constructed tests and other tests of silent reading; Part C, the correlation between the Composite of the constructed tests and tests of other school subjects.

The important facts appearing in Table I may be summarized as follows:

(1) the average coefficient of correlation between scores on the separate constructed tests and scores on tests which measure somewhat similar aspects of silent reading is .74; (2) the average coefficient of correlation between the Composite scores of the constructed tests and scores on other silent reading tests is .75; (3) the average coefficient of correlation between the Composite scores of the constructed tests and the scores on tests of achievement in other school subjects is .46.

The summary of facts may be interpreted as follows: Fairly high correlations exist between the scores on the constructed silent reading tests and

³²The formula for the co-efficient of correlation is:

$$r = \frac{\frac{S_{xy}}{N} - (cx)(cy)}{\sqrt{\frac{S_x^2}{N} - (cx)^2} \sqrt{\frac{S_y^2}{N} - (cy)^2}}$$

(See McCall: *How to Experiment in Education*, p. 229.)

TABLE I

CORRELATIONS BETWEEN SCORES ON THE CONSTRUCTED SILENT READING TESTS AND SCORES ON OTHER TESTS OF ACHIEVEMENT*

Part A:	r	P E
Word Meaning and Thorndike Word K'e-----	.800	.027
Word Meaning and Stanford Word M'g-----	.827	.021
Word Meaning and Thorndike plus Stanford Word Meaning -----	.852	.018
Rate and Monroe (Revised) Rate-----	.763	.027
Fact Material and Thorndike-McCall-----	.517	.048
Following Directions and Burgess-----	.680	.037
Total Meaning and Monroe Comprehension-----	.763	.027
Central Thought and Woody Reading-----	.743	.028
Average of coefficients-----	.74	---
Part B:		
Composite and Teachers' Marks -----	.664	.037
Composite and Stanford Total Reading-----	.795	.027
Composite and Burgess -----	.887	.016
Composite and Thorndike-McCall -----	.605	.041
Composite and Monroe Rate -----	.708	.032
Composite and Monroe Comprehension -----	.829	.021
Average of coefficients -----	.75	---
Part C:		
Composite and Stanford Arithmetic -----	.411	.055
Composite and Stanford Nature and Science-----	.534	.047
Composite and Stanford History and Literature-----	.541	.047
Composite and Stanford Language -----	.420	.054
Composite and Stanford Spelling -----	.404	.056
Average of coefficients -----	.46	---

scores on other measures of silent reading, while fairly low correlations exist between scores on the constructed silent reading tests and scores on tests in other school subjects; to the extent, therefore, that one may infer the validity of a test from the degree of its correlation with other measures of the same ability, it may be said that the facts of Table I point toward the validity of the constructed tests.

Table II shows the coefficients of correlation found between the scores on the various constructed silent reading tests. The following outstanding facts appear in this table: (1) the average coefficient of intercorrelation among the various tests is .675; (2) the variation in the size of the coefficients of correlation between the various tests is quite marked; (3) the average coefficient of correlation between the separate tests and the Composite is .814; (4) considerable variation in the degree of correlation existing between the separate tests and the composite is apparent.

In general, then, fair correlations exist between the scores on the various constructed silent reading tests, and rather high correlations exist between the scores on the separate tests and their composite scores. This undoubtedly means

*Results based on 115 cases in grades VI and VII.

TABLE II
INTERCORRELATIONS AMONG THE CONSTRUCTED READING TESTS*

Number and Name of Test		Number of Test							
		I	II	III	IV	V	VI	VII	
I: Word ----- r	---	---	.704	.835	.681	.712	.670	.620	
Meaning ----- PE	---	---	.020	.012	.021	.020	.021	.024	
II: Rate ----- r	---	---	---	.715	.625	.649	.561	.571	
----- PE	---	---	---	.020	.024	.023	.027	.027	
III: Fact ----- r	---	---	---	---	.661	.592	.656	.602	
Material ----- PE	---	---	---	---	.022	.025	.023	.025	
IV: Following - r	---	---	---	---	---	.576	.546	.530	
Directions ----- PE	---	---	---	---	---	.026	.028	.028	
V: Total ----- r		[Average inter-correlation					.675]	.627	.532
Meaning ----- PE		[Average correlation with Composite					.814]	.024	.028
VI: Central --- r	---	---	---	---	---	---	---	.520	
Thought ----- PE	---	---	---	---	---	---	---	.028	
VII: Organ- -- r	---	---	---	---	---	---	---	---	
ization ----- PE	---	---	---	---	---	---	---	---	
COMPOSITE-- r		.926	.824	.894	.761	.816	.740	.736	
SCORE ----- PE		.007	.012	.008	.016	.013	.018	.018	

that there is a tendency for the powers or abilities measured by the separate tests to accompany each other, and a more distinct tendency for these abilities to be associated with a more complete measure of them as a related group. In other words, the constructed tests would appear to be measuring fairly distinct phases of the same process when taken separately, but each one contributing to a more complete measure of the complex whole. To the extent that this is true there is probably evidence of the validity of the tests. It is well in this connection, however, to call attention to the fact that a part of the correlation between the separate tests and the Composite is self-correlation, but just how much does not appear at this point.

Assumed criterion of achievement in silent reading. In connection with the present investigation it has been necessary to assume an independent criterion as a satisfactory measure of achievement in silent reading. This criterion was constructed as follows: Equal weight was given to the measures listed below by transmuting all the scores into standard units.³³

Stanford Achievement Test: Paragraph Meaning.

Stanford Achievement Test: Sentence Meaning.

Stanford Achievement Test: Word Meaning.

Thorndike-McCall Reading Scale.

Burgess Silent Reading Test.

*Results based on 310 cases, including 66 IVB-, 69 VB-, 62 VIB-, 53 VIIB-, and 70 VIIIB-pupils.

³³The formula for the standard unit is:

$$\frac{X_i - M}{SD}$$

(See Kelley: *Statistical Method*, p. 115.)

Monroe Reading Test (Revised)—Rate.
 Monroe Reading Test (Revised)—Comprehension.
 Teachers' Reading Marks (Averaged for 3 months).

Throughout the remainder of the present dissertation reference to the "criterion" or "criterion score" will mean the composite score resulting from the above combination of measures. It must be kept in mind that it has not been assumed that the criterion is the true measure of the child's silent reading ability. On the contrary, the criterion score is a fallible score. However, keeping in mind the definition of silent reading ability presented in the introductory chapter, it may be said that the assumed criterion probably represents as satisfactory an independent index of the ability in question as one could secure. At any rate it is undoubtedly much to be preferred to a score on any single silent reading test.

Table III presents coefficients of correlation obtained between scores on the constructed silent reading tests and the criterion scores. Outstanding facts which appear in this table are: (1) the average coefficient of correlation between the criterion scores and the scores on the various constructed tests is .76; (2) the coefficient of correlation between the criterion scores and the scores of the Composite, arbitrarily weighted, is .897; (3) considerable variation appears in the degree of correlation existing between the criterion scores and the scores on the separate tests.

TABLE III
CORRELATIONS BETWEEN CRITERION SCORES AND SCORES ON THE CON-
STRUCTED SILENT READING TESTS*

	r	P E
Criterion and Word Meaning -----	.888	.008
Criterion and Rate -----	.754	.017
Criterion and Fact Material -----	.901	.007
Criterion and Following Directions -----	.710	.020
Criterion and Total Meaning -----	.753	.017
Criterion and Central Thought -----	.688	.021
Criterion and Organization -----	.610	.024
Average coefficient -----	.76	---
Criterion and COMPOSITE (arbitrary wts) -----	.897	.007

The general interpretation of the above summary of facts is that rather high correlation exist between the constructed silent reading tests and the assumed criterion, especially when the Composite is considered. If one may judge the validity of a test by the degree of its correlation with an independent criterion, he may say that the facts of Table III give evidence of the validity of the constructed tests. It is clear, of course, that all of the correlation coefficients are not equally high. It is altogether likely that the lower correlations existing in the cases of the Central Thought and Organization tests, for example, are due to the fact that the fallible criterion contains no measures of these phases of silent reading.

In the consideration of all the correlation coefficients presented in Tables I, II, and III the reader should not fail to have in mind the fact that the reliabilities of the tests themselves greatly influence the coefficients of correlation which it is possible to obtain in comparing pupils' scores on any two tests. It is possible,

*Results based on cases mentioned in Table II.

for example, that higher correlations might have been found had the reliabilities of the tests in the criterion been greater. Thus, with perfectly reliable tests throughout, it might have been possible to obtain perfect correlations between the criterion and the constructed tests.

RELATIVE PREDICTIVE VALUES OF THE TESTS

To secure data dealing with the relative predictive values of the constructed tests the results of the tests given to the Ypsilanti school children were used. Three statistical methods have been employed to bring out the facts with regard to this phase of the problem. It should be understood, in a consideration of these data as presented in the following pages, that the optimum weights which are necessary to secure the best prediction of the criterion constitute the clearest evidence of the predictive values of the constructed tests.

Table IV gives the optimum weights³³ which should be given to the various tests constructed in order to secure the highest multiple correlation with the criterion and to secure the best prediction of the criterion scores. The table includes data for the VIIB pupils separately in order to bring out certain facts regarding the significance of the weighting of the tests. Before the facts contained in Table IV may be summarized it is necessary to offer a brief explanation of the figures appearing therein. Consider the column of figures included under the IVB-VIIB group. If one were to multiply the scores in standard units which a child in this group makes on the various constructed tests by the corresponding figures

TABLE IV
OPTIMUM WEIGHTS FOR THE CONSTRUCTED TESTS NECESSARY TO OBTAIN
THE HIGHEST CORRELATION WITH THE CRITERION

Name of Test	Group Included	
	IVB—VIIB	VIIB
Word Meaning -----	.2483	.0479
Rate -----	.0554	.0858
Fact Material -----	.4873	.3263
Follow Directions -----	.0621	.1141
Total Meaning -----	.2183	.1804
Central Thought -----	.0100	.2054
Organization -----	.0277	.2385
Standard error of est. -----	.3051	.4965

or constants in this column, he would secure a total which would, on the average, closely approximate his criterion score in standard units. But there is a standard error of estimate of .3051, which, in this case, may be interpreted to mean that, after having multiplied all the child's various standard unit scores by the constants as mentioned above, there still remains a residual of 30.51 per cent* in the criterion score which is not predicted. It should be further understood that these weights are relative, giving the relative predictive values of the various tests in terms of the criterion scores.

³³The reader is referred to Kelley: *Statistical Method*, pp. 302-310.
*The standard error may be spoken of as an error of prediction of 30.51 per cent because the error in placing a child at the average would equal the standard deviation of 1.00 if none of the tests had predictive value. The tests with optimum weights reduce the standard error from 1.00 to .3051.

Keeping in mind the above explanation of Table IV, the facts appearing therein may be summarized as follows: (1) a marked variation in the power of the tests to predict the criterion scores is found; (2) the relative values of the tests for predicting the criterion scores change with the range of talent considered in a single group; (3) the error of prediction is by no means small, even when the tests are given optimum weights; (4) a marked increase in the predictive values of the Central Thought and Organization tests appears in the VIIB group.**

For the purpose of getting the facts in Table IV more clearly before the reader, it may be said that, for the larger group of children in grades IVB to VIIB, inclusive, the order of value of the various tests in obtaining the best prediction of the criterion scores is:

1. Fact Material—efficiency in getting the facts.
2. Word Meaning—knowledge of meanings of words.
3. Total Meaning—grasping total meanings.
4. Following Directions—acting on basis of reading.
5. Rate—rate of reading silently continuous selection.
6. Central Thought—finding leading ideas.
7. Organization—making logical organization.

To supplement the data found in Table IV there is presented in Table V the predictive indices³⁴ for the constructed tests. These predictive indices are in terms of the criterion scores. This is a statistical method frequently employed to indicate the relative predictive values of tests, but it would appear to be less satisfactory in the present study than the optimum weights method since it fails to consider the intercorrelations existing among the tests themselves. The predictive indices have significance, however, if for no other reason than that they give somewhat more simple approximations of the facts. To interpret the table consider, for example, the figure .5400 at the top of the first column. This means that, if one knew the scores of the children in this group on the Word Meaning

TABLE V
PREDICTIVE INDICES OF THE CONSTRUCTED TESTS IN TERMS OF THE
CRITERION SCORES

Name of Test	Group Included	
	IVB—VIIB	VIIB
Word Meaning -----	.5400	.2792
Rate -----	.3428	.1600
Fact Material -----	.5670	.3285
Follow Directions -----	.2958	.0888
Total Meaning -----	.3422	.2649
Central Thought -----	.2745	.2000
Organization -----	.2079	.1695
COMPOSITE (arbitrary) -----	.5570	.3845
COMPOSITE (optimum) -----	.6948	.5033

**Data not presented here for sake of brevity show that the Central Thought and Organization tests have fairly high weights in grades VIB, VIIB, and VIIIB, but low positive or slightly negative weights in grades IVB and VB.

³⁴The formula for the predictive index is:

$$P.I. \quad 1 - \sqrt{1 - r^2}$$

(See Bailor: *Content and Form in Tests of Intelligence*, pp. 26-29.)

test he could reduce the error of estimate of their criterion scores by 54.00 per cent over the estimate of placing each child at the average of the group. That is, the Word Meaning test would be 54.00 per cent better as a measure to predict the criterion scores than straight guessing. The other figures of the table should be interpreted in the same way.

Without attempting to make any further interpretations of them, the outstanding facts appearing in Table V are summarized as follows: (1) all of the constructed tests have predictive value; (2) the predictive indices vary from test to test; (3) when properly weighted, the Composite reduces the error of prediction of the criterion scores 69.48 per cent; (4) the Central Thought and Organization tests have relatively higher predictive values in the VIIB group.

In order to bring out certain other significant facts with regard to the relative predictive values of the constructed tests, Table VI, showing a series of multiple correlation coefficients³³, is included. This table should be interpreted as follows: Considering the first line of figures and symbols in Part A, the multiple correlation of 0.1234567 gives a coefficient of .952342. That is, the multiple correlation between the criterion and the series of seven constructed tests is .952342. This further means that, if optimum weights are given to the various constructed tests there will be obtained a maximum coefficient of correlation of .952342 between their composite and the criterion. Now, considering the first line of symbols and figures in Part B of the table, it is seen that, when optimum weights are given to the various tests, there is a correlation between the Word Meaning test and the remaining six tests as a composite of .8805.

TABLE VI
MULTIPLE CORRELATIONS OF CONSTRUCTED TESTS WITH CRITERION SCORES
AND WITH OTHER COMPOSITE SCORES

	Test Symbols	R	P E	
Part A :				
	0.1234567	.952342	.0038	
	0.234567	.9450	.004	
	0.134567	.9517	.004	Symbol Meanings
	0.124567	.9070	.007	
	0.123567	.9514	.004	0—Criterion
	0.123467	.9387	.006	1—Word Meaning
	0.123457	.9523	.004	2—Rate
	0.123456	.9521	.004	3—Fact Material
Part B :				4—Follow Dir'n.
	1.234567	.8805	.009	5—Total Meaning
	2.134567	.7681	.016	6—Central Tho't.
	3.124567	.8031	.014	7—Organization
	4.123567	.7143	.019	
	5.123467	.6762	.021	
	6.123457	.7180	.019	
	7.123456	.6578	.022	

The main facts appearing in Table VI may be summarized as follows: (1) a high multiple correlation exists between the constructed tests and the criterion; (2) certain tests may be excluded from the series of seven tests without greatly

³³The reader is referred to Kelley: *Statistical Method*, pp. 302-310.

lowering the multiple correlation of the remaining six with the criterion; (3) considerable variation in the size of the multiple correlations between the separate tests and the remaining six as a composite is apparent.

Two additional points should be made before the significance of the above summary of facts is made clear. In so far as validity may be inferred from the degree of correlation with an independent criterion, it is seen that the Composite of the constructed tests must be fairly valid because of the high correlation which obtains when the separate tests are properly weighted. So far as may be judged from the facts appearing in Part B of Table VI, the relative values of the separate tests in predicting the scores on composites made of the remaining six is indicated in the following order:

1. Word Meaning
2. Fact Material
3. Rate
4. Central Thought
5. Following Directions
6. Total Meaning
7. Organization

RELIABILITY OF THE TESTS

To secure data bearing upon the reliability of the constructed tests they were given to 100 VIB pupils and 110 VIIB pupils in the public schools of Ann Arbor, Michigan according to the following plan:

Form I—December 18, 1925.

Form II—December 21, 1925.

All data presented on this topic in the following pages are based upon the results obtained with these Ann Arbor pupils. Four statistical devices have been used for determining the degree of reliability of the tests. Perhaps the most clear-cut evidence is found in the distributions of the differences in the scores made by the same pupils on alternate forms of the tests.

Figure I gives a graphic representation of the distributions of the differences in the scores made by the same pupils on alternate forms of the tests. These differences are given in terms of standard units in order to make the results on the various tests comparable.* In these distributions the number of cases is represented by the vertical axis, and the standard units of difference are represented by the horizontal axis. The broken line running vertically through the mid-points of the curves is the exact zero point; the solid lines which parallel the broken line and run very close to it represent the means of the distributions. The important facts appearing in Figure I may be summarized as follows: (1) the means of all the distributions approximate zero; (2) the distributions of all the differences in scores approximate normal curves; (3) about one-third of all the pupils get the same score on both forms of the tests; (4) differences in scores made by the same pupils on alternate forms of the Composite show a distribution which is practically normal.

One is undoubtedly justified in interpreting these facts to mean that the tests, taken individually and collectively, are fairly reliable measures. It should not be inferred, however, that the tests are perfectly reliable; neither should it be inferred that all of the tests are equally reliable. Using this statistical device, to show perfect reliability, all the differences in scores made by the pupils should be zero.

*The data upon which this figure is based may be found in the appendix—Table G.

and to show an equal reliability of all the tests, all the distributions should duplicate each other. Nevertheless, since the means of all the distributions approx-

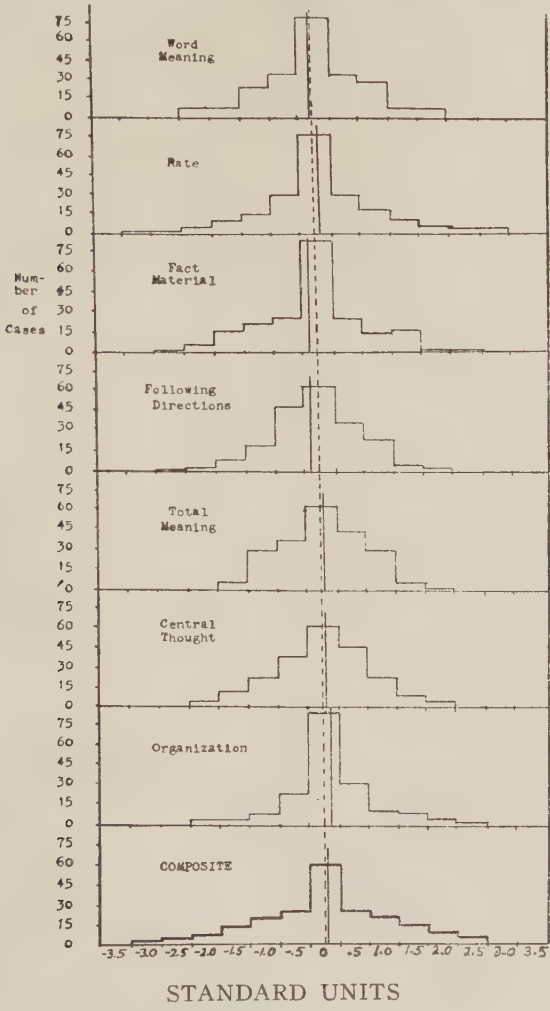


Figure I. Distributions of differences in scores made by 210 pupils on alternate forms of constructed tests.

imate zero, and since all of the distributions approximate normal curves, the tests tend toward perfect and equal reliability.

The traditional method of reporting the reliability of a test is to give its coefficient of reliability.* Table VII presents the coefficients of reliability for the various tests. The main facts appearing in this table are: (1) the average coefficient of reliability for the various tests is .88 in the case of the VIB group

*The formula for the co-efficient of reliability is that formula used for obtaining the co-efficient of correlation.

and .86 in the case of the VIIB group; (2) the coefficients of reliability for the Composite are .937 and .989 respectively in the VIB and VIIB groups; (3) con-

TABLE VII
RELIABILITY COEFFICIENTS FOR THE CONSTRUCTED TESTS

Name of Test	r	Group Included		r	P E
		VIB	VIIB		
Word Meaning -----	.866	.017	.906	.012	
Rate -----	.900	.013	.903	.012	
Fact Material -----	.875	.016	.777	.027	
Follow Directions -----	.828	.021	.809	.023	
Total Meaning -----	.877	.015	.870	.016	
Central Thought -----	.894	.015	.868	.016	
Organization -----	.881	.015	.919	.010	
Average coefficient -----	.88		.86		
COMPOSITE -----	.937	.008	.989	.003	

siderable variation in the size of the coefficients of reliability for the different tests is apparent.

It is not easy to interpret the facts found in Table VII because there has never been a definite agreement among workers in educational measurement upon what range of talent should be used in securing coefficients of reliability. Neither has there been any definite agreement as to what constitutes a satisfactory coefficient of reliability for a test. Coefficients of reliability obtained from giving alternate forms of a test to a single grade are usually reported as being between .60 and .80. If this fact has any significance, it may be said that the facts contained in Table VII show that the constructed tests have very satisfactory reliability when taken separately and a high degree of reliability when considered as a Composite. At any rate, the coefficients of reliability are somewhat higher than those generally reported for standardized educational tests.

Table VIII gives the probable errors of measurement²³ and the ratios of these probable errors to the means* for the various tests. This table should be interpreted as follows: Considering, for example, the figures opposite Word Meaning under the VIB group, it is seen that the probable error of measurement of the Word Meaning test is 1.40 or 5.8 per cent of the mean of the group. This means that 50 per cent of the scores of the group on the Word Meaning test will not be in error by more than 1.40 points or 5.8 per cent of the mean. The other figures of the table should be interpreted in this same way. In this table the ratios of the probable errors of measurement to the means is included to make the results obtained with the various tests comparable and to make more significant the probable errors themselves. The following outstanding facts appear in Table VIII: (1) on the average, the probable error of measurement of the separate tests is 8.1 per cent of the means of the group in the case of the VIB pupils and 7.9 per

²³The formula for the probable error of measurement is:

$$PEM = .6745 SD_1 \sqrt{1 - r_{12}}$$

(See Monroe: *Theory of Educational Measurement*, p. 214.)

*The means appear in Table H of the appendix.

TABLE VIII

**PROBABLE ERRORS OF MEASUREMENT AND THE RATIOS BETWEEN THEM AND
THE MEANS OF THE CONSTRUCTED TESTS**

Name of Test	Group Included			
	VIB PE _M	PE _M /M	VIIB PE _M	PE _M /M
Word Meaning -----	1.40	.058	1.19	.045
Rate -----	13.45	.062	14.57	.055
Fact Material -----	.80	.082	.99	.093
Follow Directions -----	.56	.087	.53	.071
Total Meaning -----	.59	.073	.59	.070
Central Thought -----	.58	.117	.58	.117
Organization -----	.64	.087	.71	.099
Average -----		.081		.079
COMPOSITE -----	3.45	.041	1.52	.017

cent of the means of the group in the case of the VIIB pupils; (2) the probable error of measurement of the Composite in the VIB group is 4.1 per cent of the mean and in the VIIB group 1.7 per cent of the mean; (3) considerable variation in the size of the probable errors of measurement for the different tests is found.

There is no agreement as to how large a probable error of measurement a test may have and still be considered fairly reliable. It is known, however, that a perfectly reliable test would have a probable error of measurement of .00 or .00 per cent of its mean. On the basis of this fact, one is probably justified in interpreting the general summary of facts in Table VIII to mean that the constructed tests approximate or approach satisfactory reliability, the separate tests having a probable error of measurement which is about 8.00 per cent of the means and the Composite having a probable error of measurement not to exceed 4.0 per cent of the mean in either group considered. It is quite evident, so far as may be judged from the data in Table VIII, that all of the tests are not equally reliable. The Central Thought test, for example, has a considerably higher probable error of measurement than the other tests. The Word Meaning test, on the other hand, has a probable error of measurement considerably below that of the average for the tests.

It is worth while knowing how well the constructed tests indicate the true scores of the children in that which they measure, when the "true score" is defined as the average of an infinite number of applications of the test. This is determined by calculating the probable error of estimate³³ for each of the various tests. Table IX presents the probable errors of estimate of the various tests and the ratios between these errors and the means of the tests. This table should be interpreted as follows: Considering the figures opposite Word Meaning under Form I, it is seen that the probable error of estimate of the Word Meaning test is 1.31 or 5.3 per cent of the mean in the case of Form 1. This means that, if an infinite number of forms of the Word Meaning test were given to this group of

³³The formula for the probable error of estimate is as follows:

$$PE_{EST} = .6745 SD \sqrt{r - r^2}$$

(See Kelley: *Statistical Method*, p. 215.)

children, the average scores on them would, in 50 per cent of the cases, not differ from the obtained scores on Form I by more than 1.31 points or 5.3 per cent of the mean. The table should be interpreted throughout in this manner.

The important facts contained in Table IX may be summarized as follows:

TABLE IX*

PROBABLE ERRORS OF ESTIMATE OF TRUE SCORES FROM OBTAINED AND THE RATIOS OF THESE ERRORS TO THE MEANS OF THE TESTS

Name of Test	Form of Test			
	I	II	I	II
	PEest	PEest/M	PEest	PEest/M
Word Meaning -----	1.31	.053	1.34	.056
Rate -----	12.90	.060	12.63	.058
Fact Material -----	.72	.070	.77	.084
Follow Directions -----	.53	.083	.50	.080
Total Meaning -----	.55	.068	.56	.068
Central Thought -----	.54	.110	.56	.114
Organization -----	.58	.082	.62	.082
Average -----		.077		.077
COMPOSITE -----	3.25	.039	3.36	.041

(1) the probable errors of estimate of the true scores, from the obtained, average 7.7 per cent of the means for both forms of the separate tests; (2) the probable error of estimate of the Composite is 3.9 per cent of the mean in the case of Form I and 4.1 per cent of the mean in the case of Form II; (3) considerable variation in the size of the probable errors of estimate for the different tests is found to be present.

One is only justified in interpreting the above summary of facts to mean that the errors of estimate of the true scores from the scores obtained on the constructed tests are reasonably small. It is not known how small a probable error of estimate should be in order that a test have a satisfactory reliability, but it is fairly certain that, when the error of estimate is as low as 7.7 per cent of the mean, on the average, the test must be considered fairly reliable for purposes of predicting the true score. It is more significant, however, that the error of estimate of the Composite is but 4.0 per cent of the mean. For the sake of seeing more clearly the significance of the probable error of estimate of the Composite, consider the following: The probable error of estimate of Form I of the Composite is 3.25; the difference between the means of the VIB group and the VIIB group on the Composite of Form I is 10.36; the probable error of estimate is, therefore, 31.37 per cent of the difference between the means of the two groups. In other words, in 68.63 per cent of the cases a child should be accurately placed in his group on the basis of his score on Form I of the Composite.

EQUIVALENCE OF ALTERNATE FORMS OF THE TESTS

A test may be reliable but alternate forms of the test not equivalent. That is, children may get corresponding ranks on two forms of a test, but they may not get identical scores on both forms. One of the sub-problems of this investigation is to determine the degree of equivalence of the alternate forms of the constructed

*Based on results of the 100 VIB cases. Data on the results from the 110 VIIB cases practically duplicate these.

tests. There are two sources of data from which evidence of the degree of equivalence of the test forms may be secured. Certain of the results secured from testing the Ann Arbor pupils will be considered first of all.

Reconsider the facts presented in Figure I. It is seen that all the distributions of the differences in scores made by the same pupils on alternate forms of the tests approximate normal curves. If, in any case, Form I is more difficult than Form II, the curve will be skewed to the right, and, vice versa, if, in any case, Form II is more difficult than Form I, the curves will be skewed to the left. There is a slight tendency in Figure I for the means to be positive, thus indicating somewhat higher scores on Form II than on Form I of the tests. It should be remembered, however, that there is a slight practice effect present, Form II having been given after Form I. It should also be recalled in this connection that the distributions in Figure I show that, on the average, about one-third of the scores made by pupils are identical on both forms of the tests.

Reconsider also the facts presented in Table IX. It is seen that the probable errors of estimate of the two forms of the tests are practically the same. For example, with the Word Meaning tests, Form I has a probable error of estimate of 1.31 as compared with a probable error of estimate of 1.34 for Form II. A close study of this table reveals the fact that the above example is quite typical of what is found throughout. The facts of Table IX, therefore, would seem to bear out the interpretation that the alternate forms of the tests are fairly equivalent.

Table X gives the standard deviations³² of the scores as found in giving both forms of the constructed tests to the Ann Arbor pupils. These standard deviations are important because they show, on alternate forms of the tests, the ranges within which 68.26 per cent of the scores fell. The table should, therefore, be interpreted as follows:

TABLE X

STANDARD DEVIATIONS OF SCORES ON ALTERNATE FORMS OF THE CONSTRUCTED TESTS

Name of Test	Group Included			
	VIB		VIIB	
	Form I	Form II	Form I	Form II
Word Meaning -----	5.69	5.83	5.52	5.99
Rate -----	63.68	62.34	74.10	70.56
Fact Material -----	3.22	3.45	2.82	3.55
Follow Direction -----	2.07	1.98	1.83	1.87
Total Meaning -----	2.50	2.54	2.26	2.66
Central Thought -----	2.59	2.68	2.44	2.49
Organization -----	2.67	2.84	3.72	3.67
COMPOSITE -----	19.88	20.57	21.25	21.20

Considering the data opposite Word Meaning in the VIB group, it is seen that the standard deviation of the Word Meaning test scores, Form I, is 5.69, and that for the Word Meaning test scores, Form II, is 5.83. That is, in the

³²The formula for the standard deviation is:

$$SD = \sqrt{\frac{\sum f x^2}{N} - c^2} \quad \times \text{ size of step.}$$

(See McCall: *How to Experiment in Education*, p. 147.)

case of Form I of the Word Meaning test 68.26 per cent of the scores fell between scores 5.69 points below and above the mean, while in the case of Form II 68.26 per cent of the scores fell between scores 5.83 points below and above the mean. The remaining pairs of figures in the table should be interpreted in the same way. Important facts appearing in Table X are: (1) the standard deviations of scores on alternate forms of the tests given to the same group do not differ greatly; (2) the standard deviations of scores on alternate forms of the Composite are practically the same for a given group.

One is justified in interpreting the facts contained in Table X to mean that distributions of scores made by the same pupils on alternate forms of the tests practically duplicate each other. This may be accepted as evidence that the alternate forms are about equivalent. It would be possible to show that the standard errors of these standard deviations practically account for the apparent differences of the standard deviations on the alternate forms. It has seemed best, however, not to complicate the comparisons and the facts by the use of additional statistics.

Additional data bearing upon the equivalence of the alternate forms of the tests were secured by giving them to the school children of Rockford, Michigan, and Dearborn, Michigan, on October 13, 1925, and October 17, 1925, respectively. The tests were given according to the following plan: In passing out the tests every other child was given Form I and the remaining children Form II. The two forms of the tests were thus alternated among the children without discrimination on any known count. All of the children in a given group were given the tests at the same time. The theory of this procedure is that, with a sufficient number of cases, the average ability of the group taking one form of the tests is equal to that of the group taking the other form of the tests. If the alternate forms of the tests are equivalent, therefore, the means for the two groups taking the alternate forms should be about equal.

Table XI presents the ratios between the differences in the means on the alternate forms of the tests and the probable errors of these differences³². This

TABLE XI

RATIOS BETWEEN DIFFERENCES IN THE MEANS OF ALTERNATE FORMS OF THE TESTS AND PROBABLE ERRORS OF DIFFERENCES

Name of Test	IVB	Group Included	
		VIIIB	IVB-VIIIB
Word Meaning -----	— .156	—1.074	— .334
Rate -----	1.000	.112	.544
Fact Material -----	— .940	.786	— .840
Follow Direction -----	.795	— .679	— .317
Total Meaning -----	1.941	1.581	1.523
Central Thought -----	.000	— .945	.358
Organization -----	1.614	— .534	.544
COMPOSITE -----	1.610	.690	.463
Number of Cases -----	163	120	627

³²The formula for the probable error of difference is:

$$PE_D = .6745 \sqrt{\frac{2}{SD_{M_1} - SD_{M_2}}}$$

(See McCall: *How to Experiment in Education*, p. 151.)

table presents the results for the IVB-, VIIIB-, and IVB-VIIIB- groups only. Data obtained for the VB-, VIB-, and VIIB- groups only duplicate what is contained in the table given. The table should be interpreted as follows: Considering the figure opposite Word Meaning under the IVB group, it is seen that, when the difference between the means obtained by comparable groups of IVB pupils on alternate forms of the Word Meaning test is divided by the probable error of that difference, a quotient of $-.156$ is obtained. In other words, the actual difference between the means, in this case, is but 15.6 per cent of the probable error of the difference. It is seen, then, that, in case a difference between means is greater than the probable error of the difference, the ratio will be greater than 1.000. Statisticians have generally agreed that, if a difference between means is to be practically certain, it must be at least four times the probable error of the difference, or 4.000 or more, if expressed as a ratio. In Table XI a negative sign means that the difference in means favors Form I as being more difficult, and, vice versa, a positive sign means that the difference favors Form II as being more difficult. Interpret the table throughout in the light of these facts.

The important facts appearing in Table XI may be summarized as follows: (1) none of the differences found between the means on alternate forms of the tests given to comparable groups are absolutely certain differences; (2) on the average, alternate forms of the tests show differences in means no more and no less significant in the IVB group than in the VIIIB group; (3) taking the IVB-VIIIB group, most of the differences between means on alternate forms are less than their corresponding probable errors; (4) differences between means on the alternate forms of the Composite are generally less than might be due to probable error.

The above summary of facts would seem to indicate that alternate forms of the constructed tests are practically equivalent. At any rate, it seems quite likely that, if alternate forms of the tests are given to large, comparable groups of children, the means of the scores will be practically the same.

GRADE ACHIEVEMENTS ON THE TESTS

To secure data bearing upon the comparative achievement of children as measured by the constructed tests, these tests were given to public school children in the following Michigan cities between October 15, 1925, and November 15, 1925: Wayne, Dearborn, Ypsilanti, Rockford, Greenville, and Grand Rapids. In the following pages data will be presented as obtained from the results of this testing. Since alternate forms of the tests appear to be practically equivalent, it has seemed justifiable to throw together the results on both forms to determine provisional norms of achievement and growth.

Table XII gives the means of the scores on the various tests as obtained from 3,130 cases in grades IVB to VIIIB, inclusive. The tables of distribution from which these means were calculated may be found in the appendix (Tables I-P). To interpret the table consider, for example, the groups of data opposite Word Meaning. It is seen that the mean of the IVB group on the Word Meaning test is 10.42 with a probable error³⁵ of .18; the mean of the VB group on the same test is 15.62 with a probable error of .17; and so on. Some of the outstanding facts appearing in this table are: (1) each test discriminates between the average

³⁵The formula for the probable error of the mean is:

$$PE_M = \frac{.6745 \text{ SD}}{(N)^2}$$

(See Rugg: *Statistical Method*, p. 230.)

achievement of pupils in successive school grades; (2) the means on the Composite show rather marked discrimination between average achievement in the successive school grades; (3) the separate tests vary in their power to discriminate between achievement in the successive school grades.

TABLE XII
MEANS OF SCORES MADE BY 3,130 PUPILS ON READING TESTS

Name of Test		Group Included				
		IVB	VB	VIB	VIIB	VIIIB
Word Meaning -----	M	10.42	15.62	21.72	24.82	26.86
	PE	.18	.17	.13	.16	.28
Rate -----	M	139.62	170.00	193.62	213.12	227.96
	PE	1.88	1.56	1.37	1.78	2.55
Fact Material -----	M	5.93	7.27	10.21	11.80	14.13
	PE	.09	.08	.08	.09	.16
Follow Directions -----	M	3.68	4.44	5.68	6.36	6.60
	PE	.06	.06	.05	.07	.08
Total Meaning -----	M	4.31	6.00	6.94	7.57	7.80
	PE	.07	.07	.06	.07	.10
Central Thought -----	M	2.20	3.39	4.43	5.28	5.75
	PE	.08	.06	.06	.07	.10
Organizations -----	M	4.12	4.98	6.30	6.85	7.58
	PE	.08	.07	.07	.08	.11
COMPOSITE -----	M	46.05	56.69	71.55	79.58	85.41
	PE	.59	.52	.48	.62	.87
Number of Cases -----		550	692	939	660	289

The most evident interpretation which may be placed upon the above summary of facts is that the constructed tests make fairly satisfactory discrimination between average achievement in the successive school grades. It must be clear, however, that certain of the individual tests do not discriminate carefully enough so that one could definitely place a pupil in a given grade on the basis of his score. One would find, for instance, that the probable error of estimate of the test of Following Directions is 60 per cent of the difference between the means of the grades VIIB and VIIIB. Keeping this sort of limitation in mind, one needs to exercise care in making assertions concerning the discriminatory power of certain separate tests when considering individual pupils. Of course, it is characteristic for tests of reading ability to show much less discrimination in achievement in the upper grades than in the lower grades.

One is at a loss if he attempts to compare norms of achievement obtained with this series of tests with the norms of achievement found with other silent reading tests. It is possible to make comparisons in the case of the Rate test, however, and they are included here for the sake of whatever significance they may have. The following is a comparison of the average number of words read per minute on the Starch tests, Curtis test, and the constructed tests:

Grade -----	IV	V	VI	VII	VIII
Courtis norms -----	145	168	191	---	---
Starch norms -----	144	168	192	216	240
Constructed norms -----	140	170	194	213	228

It is necessary to bear in mind, in considering these facts and all the facts of Table XII, that the number of cases involved varies from grade to grade and is, in general, rather small.

Figure II is a graphic representation of the distributions of Composite scores

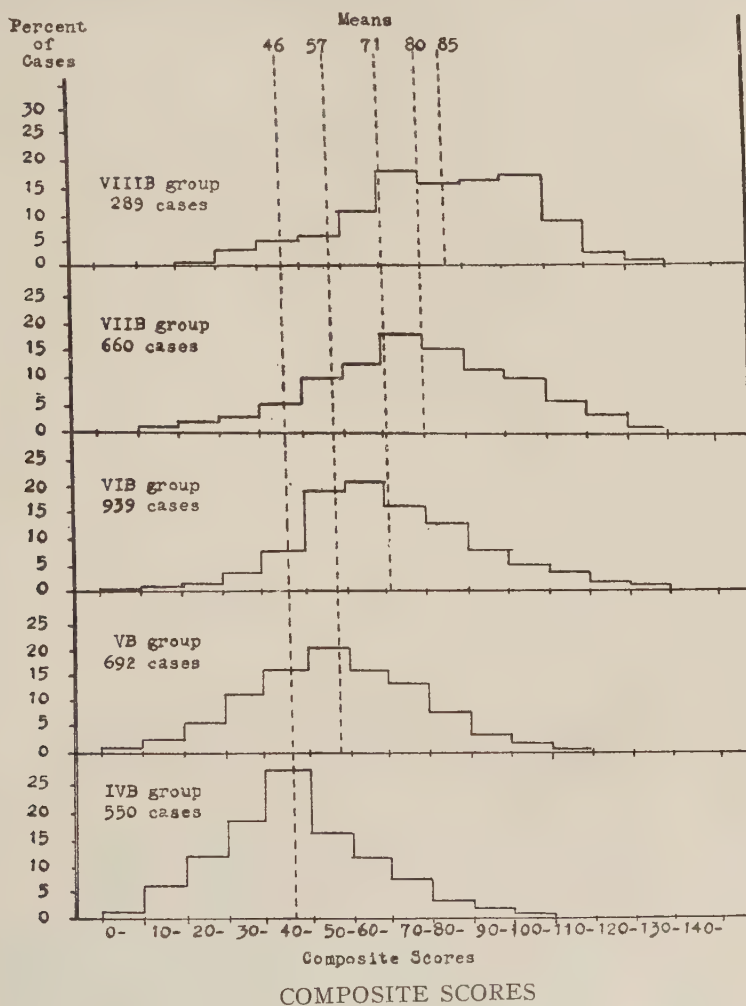


Figure II. Distributions of Composite scores made by 3,130 pupils on constructed silent reading tests.

made by 3,130 pupils on the tests. The Composite scores are represented by the horizontal axis and the per cent of cases by the vertical axis. The main facts

appearing in this figure may be summarized as follows: (1) all the curves of distribution appear approximately normal; (2) a characteristic overlapping of achievement from grade to grade is found to be present; (3) the overlapping of achievement, in general, increases as successively higher grades are compared. These facts suggest that the constructed tests show the sort of distributions of their Composite scores which should be expected if they measure satisfactorily the ability under consideration.

Figure III gives the development curves as indicated by the responses to

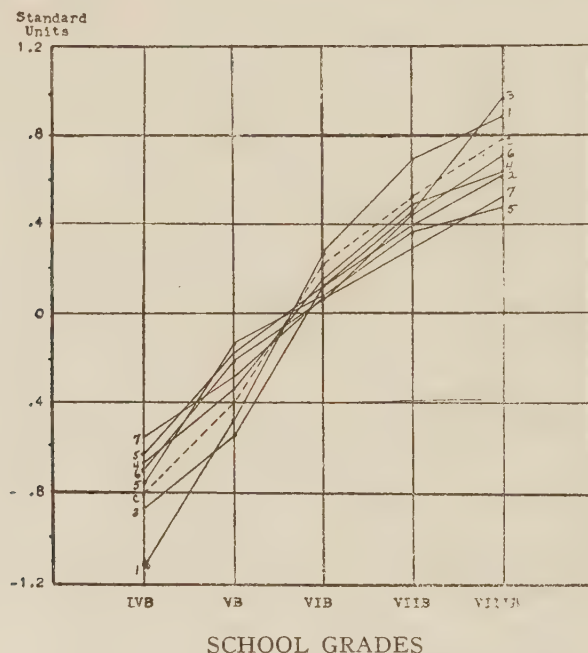


Figure III. Comparative development curves in phases of silent reading measured by constructed tests, as obtained from 3,130 pupils. Legend: 1—Word Meaning, 2—Rate, 3—Fact Material, 4—Following Directions, 5—Total Meaning, 6—Central Thought, 7—Organization, C ---- Composite.

the various silent reading situations presented to children in the constructed tests. In this figure the scores on the tests are transmuted into standard units to facilitate comparisons. The scores in standard units are represented by the vertical axis, and the successive school grades are represented by the horizontal axis. A study of this figure reveals the following facts: (1) all the curves of development in the various phases of silent reading which are measured conform to the characteristic development curves in school abilities; (2) in general, the greatest development takes place from the fourth- to the sixth-grade and the least from the sixth- to the eighth-grade; (3) apparently exceptions are found to the general course of the curves, such as a slow rise from the fourth grade with an acceleration in the upper grades, or a practically straight line of development from the fourth- to the eighth-grade.

So far as the present purposes of this dissertation are concerned it may only be suggested that the above summary of facts brings out more clearly the amount and nature of the differences in the average achievement of children in successive school grades as measured by the constructed tests on various phases of silent reading.

UTILITY OF THE TESTS

Finally, it is necessary to consider the utility of the constructed tests. Data dealing with this topic may be secured from the results of testing done in connection with other aspects of the present investigation. In presenting these data it is necessary to confine attention to the most general type of uses to which the tests may be put.

Figure IV represents graphically the average Composite scores made by pu-

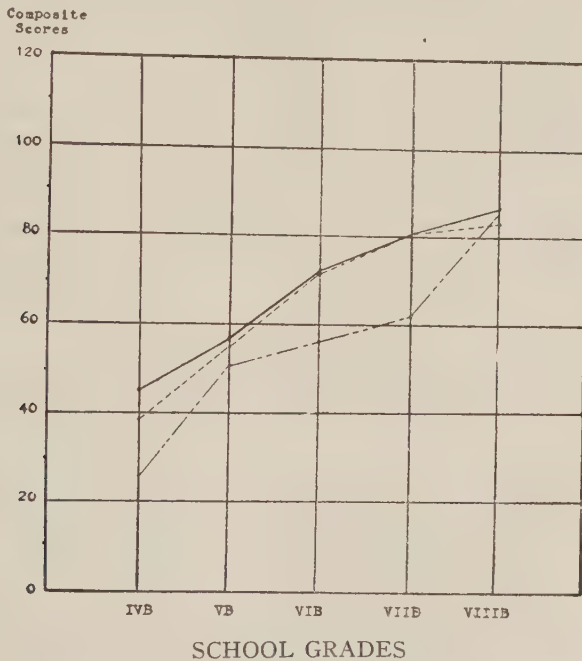


Figure IV. Comparison of Composite silent reading test scores of pupils in two Michigan cities. Legend: — norms as derived from 3,130 Michigan pupils, ---- City A of Michigan, -.- City B of Michigan.

pils in various grades in two Michigan cities in comparison with the norms found with 3130 pupils in Michigan schools. In this figure the Composite scores are represented by the vertical axis, and the school grades are represented by the horizontal axis. The main facts appearing in this figure are: (1) it is possible to compare the average achievement in Composite silent reading scores of children in one city with the average found among children in another city and with norms of achievement; (2) the status in silent reading is more satisfactory in the case of City A than in the case of City B; (3) progress in silent reading seems to be con-

tinuous and normal with the pupils of City A, but it is irregular and unusual in City B.

If one knew nothing more than these most general facts about the status in silent reading among the pupils of a city, the results of the tests would have proved useful. With these facts one would have a basis for satisfaction or dissatisfaction with prevailing conditions, emphasis upon the need of greater attention to the teaching of silent reading, careful study of the sources and causes of unsatisfactory average achievement, and the execution of plans and methods to consciously improve the silent reading condition.

Figure V gives a graphic representation of the average scores on the Fact

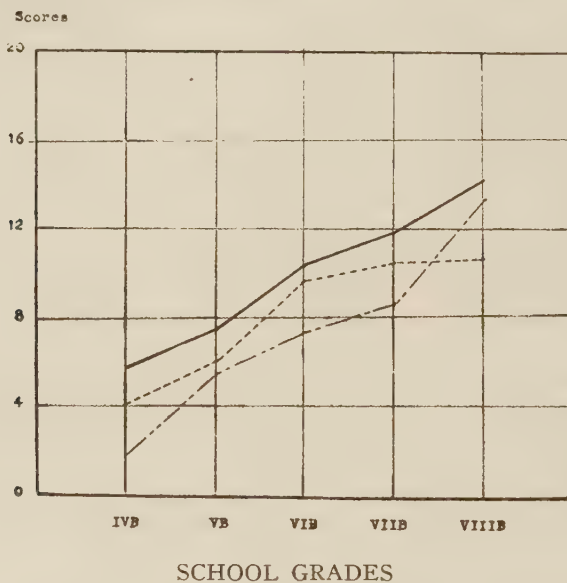


Figure V. Comparison of Fact Material test scores of pupils in two Michigan cities. Legend: — norms as derived from 3,130 Michigan pupils, ---- City A of Michigan, — · — City B of Michigan.

Material test as made by the pupils in the various grades in City A and City B in comparison with the norms obtained with 3130 Michigan pupils. In this figure the scores on the test are represented by the vertical axis, and the grades are represented by the horizontal axis. The outstanding facts revealed by this figure are: (1) it is possible to compare the average achievement of pupils in one city with the average achievement of pupils in another city and with norms as regards their scores on the Fact Material test; (2) while the status with regard to the ability to get the facts from their reading is, in general, more satisfactory in the case of City A- than in the case of City B-pupils, in both cities average achievement is considerably below the norms; (3) progress in the phase of silent reading measured is fairly regular and continuous in the case of City B pupils, but it is quite irregular and uncertain in the case of City A pupils; (4) in City A the pupils of grades VIIB and VIIIB appear to be little or no better able to get the facts from what they read than the pupils of grade VIB.

Knowing these facts about the status of silent reading, in addition to the facts appearing in Figure IV, makes the results of the tests still more useful. The most striking fact is that, if one had only known the average achievement of the pupils as measured on the Fact Material test, he would have concluded that the silent reading condition in City A was quite unsatisfactory, in fact, almost as unsatisfactory as the condition in City B. But it is seen from Figure IV that this is not the true condition, for the more complete measurement shows that the average Composite scores of the City A pupils closely approximate the norms. It is well to point out in this connection that the measurement on the Fact Material test is as satisfactory as one could find on practically any single test of silent reading; the Fact Material test has a very high correlation with the independent criterion (.910), and its reliability is reasonably high (coefficient .875). The point is, therefore, that measuring the children in a single phase of silent reading does not reveal the real truth with regard to their status in silent reading.

Taking the facts as they appear in Figure V, other uses to which the test results may be put are found. There is now basis for satisfaction or dissatisfaction with the efficiency with which the children get the facts from their reading, more emphasis upon attention to fact getting as a purpose in silent reading, careful study of the sources and causes of unsatisfactory average achievement in this phase of silent reading, and the execution of plans and methods for improving the condition with regard to this phase of silent reading. Consider, now, that facts similar to those presented in Figure V may be found with regard to other types of reading activity and other phases of reading measured by the constructed tests, and the degree of utility of the tests becomes more significant.

Figure VI is a graphic representation of the average achievement of children in grades IVB to VIIIB of City A in the various phases of silent reading measured by the tests. For purposes of comparison the scores on all tests are transmuted into standard units. In this figure the scores in standard units are represented by the vertical axis, and the numbers of the various tests appear beneath the columns. The figure is to be interpreted as follows: Considering the results for the IVB group, it is seen that the average achievement of the group on Test I, WORD MEANING, is -1.2 ; on Test II, RATE, it is $-.7$; on Test III, FACT MATERIAL, it is -1.3 ; and so on. The average Composite achievement of the group is -1.1 , and the norm is $-.8$. The principal facts appearing in Figure VI are: (1) it is possible to compare the average achievement of a group of children in the various phases of silent reading measured by the tests; (2) within each group a considerable variation in the average achievement in the various phases of silent reading measured is found; (3) the variation in average achievement in the various phases of reading measured is more marked in the case of the IVB group than in the case of the VIIIB group.

These facts show the possible utility of the tests from another angle. On the basis of these results it is now possible to shift or increase emphasis upon a particular phase of silent reading, study the sources or causes of inferior achievement in a particular phase, and put into operation plans and methods for improving the conditions in silent reading within the group. The facts of Figure VI emphasize once more the importance of measuring pupils in a variety of phases or activities in silent reading in order to be certain concerning their true status.

Disregarding for the time being that the individual tests are not perfectly reliable, let the results of the tests with the individual child be considered. Figure VII represents graphically the achievement in the various phases of silent

reading measured for four children in a City A school. To facilitate comparisons the scores are transmuted into standard units. In this figure the scores in standard units are represented by the vertical axis, and the numbers of the various tests appear beneath the columns. The main facts revealed by this figure may be

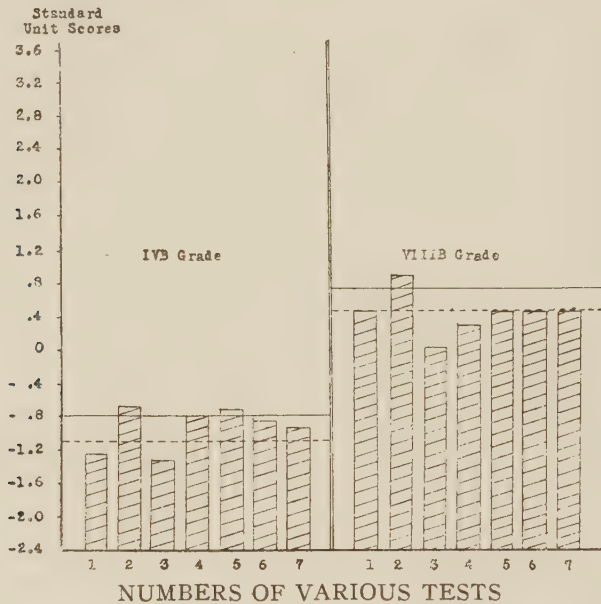


Figure VI. Comparison of Average Achievement in Various Phases of Silent Reading for Pupils in Grades IVB and VIIIB in City A of Michigan. Legend: 1—Word Meaning, 2—Rate, 3—Fact Material, 4—Following Directions, 5—Total Meaning, 6—Central Thought, 7—Organization, ---- Grade Composite Score, — Grade Norm.

stated as follows: (1) the average or Composite achievement of a certain IVB pupil is nearly equal to that of a "good" VIIIB pupil in the same school, greater than that of a "poor" VIIIB pupil in the same school, and very much greater than that of another IVB pupil in his own group; (2) each individual pupil varies in his achievement in the various phases of silent reading as measured by the tests; (3) the amount of variation in achievement in the various phases measured is greater with the IVB pupils than with the VIIIB pupils; (4) a given pupil tends to be inferior or superior or mediocre in all the phases of silent reading measured by the tests.

Tempering his decisions with the knowledge that the single tests are not perfectly reliable when applied to individual children, one still has basis in the above summarized facts to shift or increase emphasis upon a certain phase of silent reading for the individual child, to investigate the causes of his inferior achievement in certain or all phases of silent reading measured, and to execute plans for the improvement of his achievement in silent reading. Finally, one should call attention to the fact that nothing appears more evident in Figure VII than that

which C. T. Gray has said:²⁰ "If reading ability of the individual child is to be investigated in its entirety, different tests, each of which measures a different phase of reading activity, must be used."

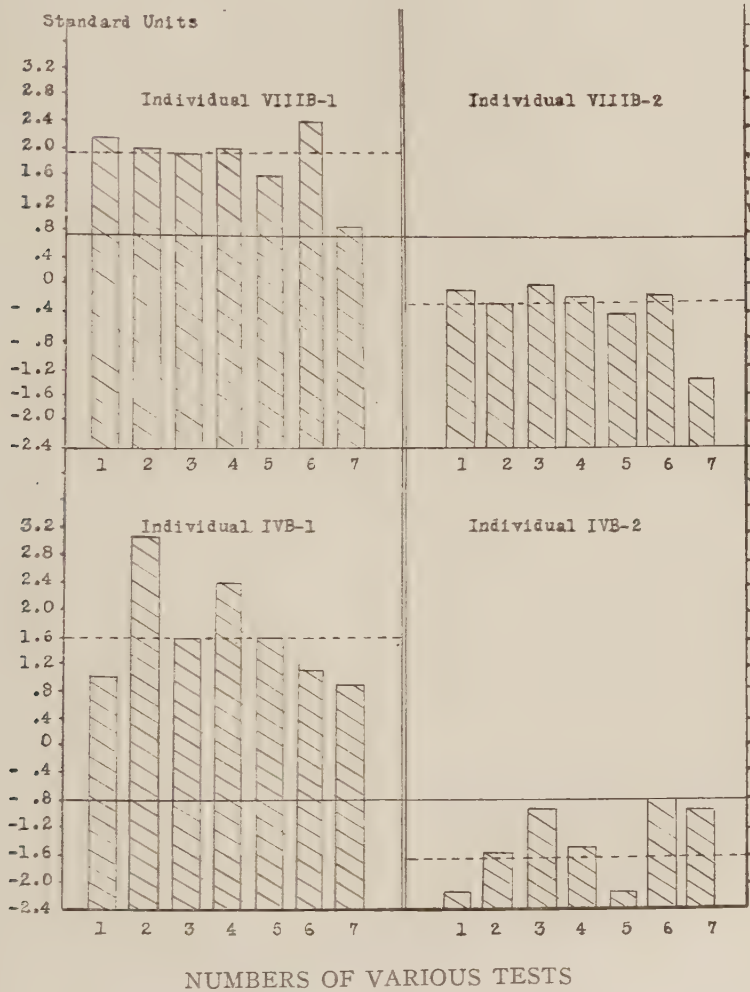


Figure VII. Comparison of Scores in Various Phases of Silent Reading for Individuals in a School of City A. Legend: 1—Word Meaning, 2—Rate, 3—Fact Material, 4—Following Directions, 5—Total Meaning, 6—Central Thought, 7—Organization, ——— Grade Norm, ---- Individual Composite Score.

²⁰Gray, C. T., *Deficiencies in Reading Ability*, p. 24.

CHAPTER IV

SUMMARY AND CONCLUSIONS

THE GENERALIZATIONS

In drawing conclusions from the results obtained in this investigation it is very important to bear in mind the limitations which exist in the test as constructed, the limitations inherent in the statistical treatment of educational problems, and the exceedingly difficult and complex task involved in interpreting data collected in educational investigations. Keeping in mind, also, the definition placed upon silent reading ability in connection with the present investigation, the following generalizations seem justifiable:

1. The constructed silent reading tests may be said to measure significant phases of silent reading because of their harmonization with the aims as set forth by the National Committee on Reading and emphasized by certain authorities in the psychology and pedagogy of reading, and because of their employment of materials and situations fairly typical of those which the child encounters.

2. The validity of the constructed tests is fairly well established by such facts as: fairly high correlations between the tests, individually and collectively, and numerous other independent measures of silent reading; fairly low correlations between them, collectively, and standardized tests in other school subjects; a satisfactory power of discrimination between average achievement in the successive school grades; and distributions of the scores which appear approximately normal.

3. Partial regression coefficients indicate that all of the constructed tests have value in predicting independent criterion scores obtained from a composite of eight measures of silent reading and that the order of their relative values in predicting criterion scores for a IVB-VIIIB group of pupils is:

- Fact Material—getting facts from material read.
- Word Meaning—extent of knowledge of word meanings.
- Total Meaning—grasping total meaning of paragraphs.
- Follow Directions—acting on basis of reading.
- Rate—rate of reading continuous selection.
- Central Thought—finding leading idea of paragraphs.
- Organization—making logical organizations of ideas.

4. Multiple correlation coefficients and partial regression coefficients show that, with the best weighting of the constructed tests, the criterion scores can be predicted with about 70 per cent accuracy.

5. Multiple correlation coefficients indicate that the relative values of the constructed tests for predicting composite scores made from the other six tests in the series of seven may be given in the following order:

Word Meaning
Fact Material
Rate
Central Thought
Following Directions
Total Meaning
Organization

6. The reliability of the constructed tests is found to be rather high, especially when they are considered as a composite. This fact is evidenced by significant self-correlations, low probable errors of measurement and estimate, and approximately normal distributions of the differences in scores made by the same individuals on alternate forms of the tests.

7. Alternate forms of the constructed tests were found to be practically equivalent. This was shown by insignificant differences in the means on the tests when given to the same of comparable groups, only slight differences in the standard deviations of scores on alternate forms when given to the same groups, rather large percentage of zero differences between scores made by the same pupils on alternate forms, and approximately normal distributions of these differences.

8. Considering that generalizations No. 6 and No. 7 are based upon results secured from testing entirely done by the teachers in charge, the objectivity of the constructed tests seems quite apparent.

9. Results obtained from 3130 school children of Michigan show that each of the tests discriminates between average achievement in the successive grades and that the Composite generally makes this discrimination more definitely than the single tests.

10. When scores on the various tests are transmuted to a comparable basis, development curves in the various phases of silent reading measured conform pretty generally to characteristic development curves found for all school abilities. In general, there is a rapid rise from the fourth grade to the sixth and a gradual slowing up from the sixth grade to the eighth. Certain curves show a tendency to vary from this general course.

11. The results of the tests may be used to give information concerning the general status in silent reading of school children as groups or as individuals, and they may be used to secure information concerning the achievement of a group or, within certain limitations, of an individual as regards a particular phase of silent reading. On the basis of this information steps may be taken to determine causes and prescribe methods for improvement either with regard to a particular silent reading activity or with regard to the total situation.

12. Measurement of the individual or the group in a single phase of silent reading or in a single type of silent reading activity does not give a true index of silent reading ability, for both the individual and the group vary in the effectiveness with which they respond in different silent reading situations involving different materials and purposes.

13. The distinctive contribution of this study is that a reasonably satisfactory group of tests have been constructed which make specific measures of achievement in several important phases of silent reading. These tests make possible a more complete measure of silent reading ability, as here defined, and a determination of the status of the individual or the group with regard to a particular type of silent reading activity or a distinctive phase of the process.

APPLICATIONS TO TEACHING PROCEDURE

The problem undertaken in this study was conceived as one having a practical bearing upon the teaching procedure involved in the development of silent reading ability. Its final justification rests upon whether the results obtained can point toward any fairly simple applications to the teaching of silent reading. In what follows the author shall take a somewhat dangerous step in suggesting a few applications which seem worthy of consideration in the light of what the present study adds to already existing knowledge of the psychology and pedagogy of reading.

1. It should be clear to the teacher that, as silent reading ability is ordinarily defined, she cannot hope to secure an adequate, diagnostic measure of silent reading by giving a single test involving a single phase or activity of the process.

2. Since the immediate aim of silent reading is comprehension, it becomes necessary to measure carefully to determine how well the child comprehends. But, since the evidences of comprehension differ according to the purpose for which the child reads, it is necessary to determine how well the child comprehends in a variety of silent reading situations involving a variety of materials and purposes.

3. It is exceedingly important to know why a child responds as he does in various silent reading situations in order that corrective steps may be taken. In the absence of knowledge of exactly why a child responds as he does, it would seem best to proceed by training him in the type of activity in which he is deficient.

4. Development in the various types of silent reading activity takes place quite simultaneously. The teacher should not expect that at a certain age or during a particular grade a child suddenly comes into possession of desirable habits of silent reading; rather, a child at a certain age or in a particular grade should be expected to make effective responses in various silent reading situations, but the degree of effectiveness should be expected to increase with maturity and training.

5. The fact that children show low comprehension scores when reading for certain purposes from materials supposedly appropriate to their grades may indicate that the materials themselves are not well graded. It would seem, therefore, to be a part of the teacher's task to determine what materials are really suitable for use in connection with developing habits essential in reading materials for different purposes.

6. The teacher should not infer from the fact that norms of achievement in silent reading are established that these constitute standards of achievement. The norms simply tell what is being accomplished under present conditions; they do not tell what could be accomplished under better conditions. Neither should the teacher infer from the fact that the average child of a given grade reads at a certain rate that every child in the grade should read at that rate; the rate of reading must necessarily vary with the individual and with the purpose or activity involved in the reading.

PROBLEMS FOR FURTHER STUDY

It would be unfair, both to the reader and to the author of this dissertation, if attention were not called to some of the outstanding problems that have arisen during the course of this study, problems which could not be solved due to the limitations imposed by time and purpose. Among the more important of these problems are:

1. What are the important factors which determine the child's achievement in a particular phase of silent reading and in the various silent reading activities?

2. To how difficult paragraphs or selections can a child respond correctly when reading for different purposes?

3. To what extent are low correlations between the various phases of silent reading due to irregular and improper instructional emphasis?, and to what extent are they due to distinct differences in the abilities involved?

4. What will be the effect of specific practice upon the types of silent reading activity in which a child is deficient?

5. To what extent are the materials used in the various school grades actually suitable for developing the habits of intelligent interpretation in the different silent reading activities in which a child should engage?

6. What really definite and fixed statistical requirements shall be placed upon an educational test in order that it meet the generally accepted criteria?

BIBLIOGRAPHY

- 1 Twenty-Fourth Yearbook of the National Society for the Study of Education, Part I, *Report of the National Committee on Reading*, (Bloomington, Illinois: Public School Publishing Company, 1925).
- 2 Kelly, F. J., "The Kansas Silent Reading Test," *Journal of Educational Psychology*, 7: 63-80.
- 3 Thorndike, Edward L., "The Measurement of Ability in Reading," *Teachers College Record*, 15: 207-277; 16: 445-467; 17: 40-67.
- 4 Starch, Daniel, "The Measurement of Efficiency in Reading," *Journal of Educational Psychology*, 6: 1-24.
- 5 Brown, H. A., "The Measurement of Ability to Read," (Concord, New Hampshire: Department of Public Instruction, 1916), *Research Bulletin* I: 57.
- 6 Courtis, S. A., *Courtis Silent Reading Test No. 2*, (Detroit: Courtis Standard Tests).
- 7 Fordyce, Charles, *A Scale for Measuring Achievement in Reading*, (Lincoln, Nebraska: The University Publishing Company).
- 8 Monroe, W. S., "Monroe's Standardized Silent Reading Tests," *Journal of Educational Psychology*, 9: 303-312.
- 9 Burgess, May A., *The Measurement of Silent Reading*, (New York: Russell Sage Foundation, 1921), p. 163.
- 10 Woody, Clifford, "Measurement of a New Phase of Reading," *Journal of Educational Research*, 8: 315-326.
- 11 Chapman, J. Crosby, and Cook, Seida, "Principle of the Single Variable in the Speed of Reading Cross-Out Test," *Journal of Educational Research*, 8: 389-396.
- 12 Stone, C. R., "Recent Developments in Silent Reading Tests," *Journal of Educational Research*, 6: 102-115.
- 13 Haggerty, M. E. and Noonan, M. E., *Achievement Examination in Reading, Sigma I*, (Chicago: World Book Company, 1920).
- 14 Haggerty, M. E., "The Ability to Read: Its Measurement and Some Factors Conditioning It," *Indiana University Studies*, 1917, No. 34, p. 63.
- 15 Kelley, T. L., Ruch, G. M. and Terman, L. M., *Stanford Achievement Tests*, (New York: World Book Company, 1922).
- 16 Thorndike, Edward L., "Measurement of Achievement in Reading: Word Meaning," *Teachers College Record*, 17 430-454.
- 17 Thorndike, Edward L. and Symonds, P. M., "Derivation, Reliability, and Grade Achievements in a Test of English Vocabulary," *Teachers College Record*, 24: 438-445.
- 18 Greene, H. A., "Tests for the Measurement of Certain Phases of Linguistic Organization," *Journal of Educational Psychology*, 11: 517-525.

- 19 Monroe, W. S., DeVoss, J. C. and Kelly, F. J., *Educational Tests and Measurements*, (New York: Houghton Mifflin Company, 1924).
- 20 Gray, Clarence, T., *Deficiencies in Reading Ability*, (Chicago: D. C. Heath & Company, 1922).
- 21 Courtis, S. A., "Analysis of Reading Ability," *Journal of Educational Research*, 4: 287-293.
- 22 Otis, A. S., "Consideration Concerning the Making of a Scale for the Measurement of Reading," *Pedagogical Seminary*, 23: 528-549.
- 23 Monroe, W. S., *The Theory of Educational Measurement*, (New York: Houghton Mifflin Company, 1923).
- 24 McCall, William, *How to Measure in Education*, (New York: MacMillan Company, 1923).
- 25 Dickinson, Dick, "The Importance of Vocabulary in Reading," *Elementary School Journal*, 20: 537-546.
- 26 Hilliard, George H., "Probable Types of Difficulties Underlying Low Scores in Comprehension Tests," *University of Iowa Studies in Education* II, No. 6, 1924.
- 27 Thorndike, Edward L., *The Teacher's Word Book*, (New York: Teachers College Publications, 1921).
- 28 Gray, W. S., "The Importance of Intelligent Silent Reading," *Elementary School Journal*, 24: 348-356.
- 29 Gray, W. S., "The Relation Between Reading and Study," *National Education Association: Addresses and Proceedings*, 57: 580-586.
- 30 Hill, H. O., and Lyman, R. L., *Reading and Living, Book One*, (New York: Charles Scribner's Sons, 1924).
- 31 Horn, Ernest, "A Constructive Program in Silent Reading," *Journal of Educational Research*, 3: 336-344.
- 32 McCall, William, *How to Experiment in Education*, (New York: MacMillan Company, 1923).
- 33 Kelley, Truman L., *Statistical Method*, (New York: MacMillan Company, 1923).
- 34 Bailor, Edwin M., "Content and Form in Tests of Intelligence," *Teachers College Contributions to Education*, No. 162, 1924.
- 35 Rugg, Harold O., *Statistical Methods Applied to Education*, (New York: Houghton Mifflin Company, 1917).

APPENDIX

TABLES A—F

THE RELATIVE DIFFICULTY OF ELEMENTS IN VARIOUS TESTS (Based on results from 680 IVB-VIIIB pupils)

TABLE A — WORD MEANING

Exercise Number	Form I			Form II		
	Thorndike Count	Per Cent Failing	P.E.	Thorndike Count	Per Cent Failing	P.E.
1 -----	99	3	—2.8	73	2	—3.0
2 -----	93	3	—2.8	67	3	—2.8
3 -----	85	3	—2.8	38	4	—2.6
4 -----	80	4.5	—2.5	91	5	—2.4
5 -----	78	5	—2.4	63	5	—2.4
6 -----	71	6	—2.3	41	6	—2.3
7 -----	32	7	—2.2	84	7	—2.2
8 -----	33	7	—2.2	71	8	—2.1
9 -----	25	7	—2.2	23	8	—2.1
10 -----	48	8	—2.1	22	8	—2.1
11 -----	55	8	—2.1	90	9	—2.0
12 -----	43	8	—2.1	57	10	—1.9
13 -----	64	9	—2.0	47	10	—1.9
14 -----	63	9	—2.0	44	11	—1.8
15 -----	36	9	—2.0	26	11	—1.8
16 -----	9	10	—1.9	80	12	—1.7
17 -----	28	10	—1.9	52	12	—1.7
18 -----	52	11	—1.8	26	13	—1.6
19 -----	38	11	—1.8	37	15	—1.5
20 -----	23	11	—1.8	7	16	—1.5
21 -----	22	12	—1.7	16	17	—1.4
22 -----	17	14	—1.6	13	17	—1.4
23 -----	13	16	—1.4	17	18	—1.3
24 -----	5	18	—1.3	6	21	—1.2
25 -----	4	21	—1.2	6	21	—1.2
26 -----	7	25	—1.0	5	25	—1.0
27 -----	45	27	— .9	5	29	— .8
28 -----	8	30	— .7	9	29	— .8
29 -----	7	34	— .6	4	35	— .6
30 -----	6	40	— .4	46	41	— .4
31 -----	3	44	— .2	4	45	— .2
32 -----	16	48	— .1	3	50	— .0

33 -----	42	52	.1	12	53	.1
34 -----	9	57	.2	31	56	.2
35 -----	5	61	.3	3	62	.3
36 -----	6	69	.5	4	66	.4
37 -----	8	73	.6	8	76	.7
38 -----	3	79	.8	7	81	.9
39 -----	4	82	.9	9	84	1.0
40 -----	12	85	1.0	33	84	1.0

TABLE B — FACT MATERIAL

Exercise Number	Form I		Form II	
	Per Cent Failing	P.E.	Per Cent Failing	P.E.
1 -----	10	—1.9	5	—2.4
2 -----	5	—2.4	10	—1.9
3 -----	5	—2.4	4	—2.6
4 -----	4	—2.6	4	—2.6
5 -----	4	—2.6	8	—2.1
6 -----	8	—2.1	6	—2.3
7 -----	4	—2.6	4	—2.6
9 -----	5	—2.4	6	—2.3
8 -----	6	—2.3	10	—1.9
10 -----	9	—2.0	10	—1.9
11 -----	6	—2.3	8	—2.1
12 -----	4	—2.6	7	—2.2
13 -----	5	—2.4	6	—2.4
14 -----	4	—2.6	7	—2.3
15 -----	9	—2.0	9	—2.0
16 -----	8	—2.1	7	—2.2
17 -----	5	—2.4	9	—2.0
18 -----	7	—2.2	10	—1.9
19 -----	7	—2.2	8	—2.1
20 -----	8	—2.1	5	—2.4

TABLE C — FOLLOWING DIRECTIONS

Exercise Number	Form I		Form II	
	Per Cent Failing	P.E.	Per Cent Failing	P.E.
1 -----	17	—1.4	18	—1.3
2 -----	10	—1.9	13	—1.7
3 -----	15	—1.6	10	—1.9
4 -----	10	—1.9	13	—1.7
5 -----	13	—1.7	14	—1.6
6 -----	10	—1.9	14	—1.6
7 -----	11	—1.8	17	—1.4
8 -----	10	—1.9	11	—1.8
9 -----	9	—2.0	13	—1.7
10 -----	13	—1.7	18	—1.3

TABLE D — TOTAL MEANING

Exercise Number	Form I		Form II	
	Per Cent Failing	P.E.	Per Cent Failing	P.E.
1 -----	6	—2.3	7	—2.2
2 -----	11	—1.8	5	—2.4
3 -----	10	—1.9	6	—2.3
4 -----	8	—2.1	6	—2.3
5 -----	6	—2.3	7	—2.2
6 -----	5	—2.4	7	—2.2
7 -----	7	—2.2	5	—2.4
8 -----	5	—2.4	7	—2.2
9 -----	8	—2.1	4	—2.6
10 -----	7	—2.2	5	—2.4
11 -----	10	—1.9	6	—2.3
12 -----	9	—2.0	9	—2.0

TABLE E — CENTRAL THOUGHT

Exercise Number	Form I		Form II	
	Per Cent Failing	P.E.	Per Cent Failing	P.E.
1 -----	48	— .1	43	— .3
2 -----	50	— .0	47	— .1
3 -----	47	— .1	57	.2
4 -----	56	.1	44	— .2
5 -----	44	— .2	47	— .1
6 -----	46	— .2	44	— .2
7 -----	46	— .2	43	— .3
8 -----	51	.0	45	— .2
9 -----	44	— .2	51	.0
10 -----	45	— .2	46	— .1

TABLE F — ORGANIZATION

Exercise Number	Form I		Form II	
	Per Cent Failing	P.E.	Per Cent Failing	P.E.
1 -----	40	— .4	41	— .4
2 -----	43	— .3	41	— .4
3 -----	39	— .4	50	.0
4 -----	45	— .2	49	.0
5 -----	45	— .2	45	— .2
6 -----	40	— .4	43	— .3
7 -----	47	— .1	47	— .1
8 -----	36	— .5	42	— .3
9 -----	43	— .3	50	.0
10 -----	44	— .3	46	— .2
11 -----	46	— .2	45	— .2
12 -----	38	— .4	40	— .4

TABLE G

**DISTRIBUTIONS OF DIFFERENCES IN SCORES MADE BY THE SAME PUPILS ON
ALTERNATE FORMS OF THE TESTS**

Differences in SD Units	Number of Test							
	I	II	III	IV	V	VI	VII	COMP.
3.5—	—	1	—	—	—	—	—	—
3.0—	—	5	—	—	—	—	—	1
2.5—	—	5	1	—	1	1	3	4
2.0—	5	6	1	1	1	4	5	10
1.5—	6	12	17	6	4	6	10	15
1.0—	25	20	15	24	29	23	11	21
.5—	33	29	26	37	45	45	33	26
.0—	74	74	86	65	64	62	110	61
— .5—	31	29	25	49	35	35	24	26
—1.0—	22	16	19	19	28	22	8	21
—1.5—	7	8	15	6	4	8	3	13
—2.0—	7	3	4	2	0	3	3	8
—2.5—	1	1	1	1	1	1	—	3
—3.0—	1	—	—	—	—	—	—	1
—3.5—	—	—	—	—	—	—	—	—
Number	210	210	210	210	210	210	210	210
Mean	— .02	.17	— .04	— .04	.05	.03	.19	.05

TABLE H

MEANS OF SCORES MADE BY ANN ARBOR PUPILS ON TESTS

Name of Test	VIB Group			VIIB Group		
	Form I	Form II	Avg.	Form I	Form II	Avg.
Word Meaning	24.4	23.8	24.1	26.0	26.7	26.4
Rate	214.9	217.3	216.1	256.5	269.4	263.0
Fact Material	10.2	9.1	9.6	10.8	10.6	10.7
Follow Direction	6.4	6.3	6.4	7.5	7.5	7.5
Total Meaning	8.0	8.2	8.1	8.3	8.8	8.5
Central Thought	4.9	4.9	4.9	6.1	6.5	6.3
Organization	7.1	7.6	7.3	6.9	7.5	7.2
COMPOSITE	81.7	81.3	81.5	90.7	92.9	91.8
No. of Cases	100	100	100	110	110	110

TABLES I—P

DISTRIBUTIONS OF SCORES MADE BY 3,130 PUPILS ON TESTS

TABLE J—FOLLOWING DIRECTIONS

Score	Grade				
	IVB	VB	VIB	VIIB	VIIIB
10	4	9	57	66	16
9	8	20	60	77	44
8	20	32	83	84	47

7-----	29	64	128	85	49
6-----	57	100	146	107	44
5-----	72	104	176	97	43
4-----	85	112	141	82	25
3-----	94	105	93	34	13
2-----	88	85	32	17	5
1-----	51	46	15	9	1
0-----	42	15	8	2	2
No. of cases-----	550	692	939	660	289
Means -----	3.68	4.44	5.68	6.36	6.60
Standard Dev. -----	2.23	2.22	2.20	2.62	2.14

TABLE I—WORD MEANING

Score	IVB	VB	Grade VIB	VIIIB	VIIIB
40-----	---	---	---	---	1
38-----	---	---	3	8	8
36-----	---	---	7	19	20
34-----	---	2	21	29	28
32-----	---	3	16	40	19
30-----	---	5	39	49	23
28-----	1	2	58	56	47
26-----	0	17	73	64	28
24-----	2	31	100	86	23
22-----	7	49	119	91	25
20-----	26	87	145	74	20
18-----	39	76	138	66	14
16-----	40	76	67	28	13
14-----	49	74	67	19	7
12-----	64	66	35	15	4
10-----	56	63	19	9	2
8-----	50	49	13	3	2
6-----	47	30	8	2	1
4-----	62	27	7	1	4
2-----	63	17	3	1	---
0-----	44	18	1	---	---
No. of cases-----	550	692	939	660	289
Means -----	10.42	15.62	21.72	24.82	26.86
Standard Dev. -----	6.02	6.60	6.26	6.32	7.26

TABLE N—CENTRAL THOUGHT

Score	IVB	VB	Grade VIB	VIIIB	VIIIB
10-----	1	3	28	29	14
9-----	0	10	36	56	47
8-----	1	19	60	71	34
7-----	10	22	81	75	28
6-----	14	52	94	74	37
5-----	28	81	126	84	30

4-----	54	105	141	84	31
3-----	90	117	137	85	23
2-----	132	118	128	54	26
1-----	143	95	70	36	13
0-----	77	70	38	12	6
No. of cases-----	550	692	939	660	289
Means-----	2.20	3.39	4.43	5.28	5.75
Standard Dev.-----	1.68	2.15	2.49	2.56	2.70

TABLE K—RATE

Score	IVB	VB	Grade VIB	VIIB	VIIIB
360-----	2	7	6	21	6
340-----	4	1	15	23	6
320-----	1	4	18	23	16
300-----	2	4	20	18	24
280-----	5	12	42	36	23
260-----	7	19	49	29	24
240-----	10	33	85	63	26
220-----	17	48	67	52	30
200-----	22	68	96	76	37
180-----	56	101	129	101	30
160-----	43	98	114	72	19
140-----	80	96	105	52	15
120-----	70	49	73	48	17
100-----	77	64	52	28	12
80-----	52	41	31	12	3
60-----	60	23	28	4	1
40-----	26	16	6	2	---
20-----	12	7	3	---	---
0-----	4	1	---	---	---
No. of cases-----	550	692	939	660	289
Means-----	139.62	170.00	193.62	213.12	227.96
Standard Dev.-----	62.00	61.40	63.00	68.80	65.40

TABLE L—FACT MATERIAL

Score	IVB	VB	Grade VIB	VIIB	VIIIB
20-----	---	---	7	13	31
19-----	19	---	17	17	22
18-----	---	1	9	26	26
17-----	5	6	16	18	21
16-----	2	3	35	40	14
15-----	1	3	37	41	24
14-----	2	15	60	59	24
13-----	7	25	86	49	22
12-----	7	16	55	73	23
11-----	10	41	76	67	17
10-----	22	55	110	69	20

9-----	34	61	126	70	15
8-----	48	82	79	40	9
7-----	60	85	74	32	10
6-----	82	76	69	27	1
5-----	80	73	38	10	8
4-----	75	64	23	7	2
3-----	71	53	12	1	---
2-----	35	29	9	1	---
1-----	7	1	---	---	---
0-----	2	---	---	---	---
No. of cases-----	550	692	939	660	289
Means -----	5.93	7.27	10.21	11.80	14.13
Standard Dev. -----	3.04	3.24	3.71	3.70	4.25

TABLE M—TOTAL MEANING

Score	IVB	VB	Grade VIB	VIIB	VIIIB
12-----	9	27	56	59	26
11-----	6	29	52	47	22
10-----	7	30	74	56	31
9-----	13	46	68	62	36
8-----	28	58	102	90	36
7-----	43	88	140	117	45
6-----	52	95	158	87	28
5-----	100	103	134	64	30
4-----	94	94	94	53	18
3-----	70	56	34	16	6
2-----	50	34	13	6	9
1-----	46	23	10	3	2
0-----	32	9	4	---	---
No. of cases -----	550	692	939	660	289
Means -----	4.31	6.00	6.94	7.57	7.80
Standard Dev. -----	2.53	2.77	2.66	2.61	2.60

TABLE O—ORGANIZATION

Score	IVB	VB	Grade VIB	VIIB	VIIIB
12-----	7	12	36	63	33
11-----	8	16	55	49	26
10-----	5	23	66	49	32
9-----	11	22	51	66	28
8-----	35	67	109	65	37
7-----	38	65	126	73	34
6-----	51	71	130	68	29
5-----	165	95	103	55	22
4-----	106	101	88	48	14
3-----	71	80	67	43	15
2-----	73	60	58	41	8

1-----	32	36	29	18	2
0-----	48	44	18	22	9
No. of cases -----	550	692	939	660	289
Means -----	4.12	4.98	6.30	6.86	7.58
Standard Dev. -----	2.66	2.83	3.11	3.31	2.84

TABLE F—COMPOSITE

Score	IVB	VB	Grade .VIB	VIIIB	VIIIB
140—	---	---	---	---	---
130—	---	---	1	7	3
120—	---	---	7	28	5
110—	---	1	32	42	25
100—	5	11	50	64	52
90—	7	24	81	77	46
80—	15	53	127	99	43
70—	38	95	156	121	50
60—	63	114	187	86	28
50—	86	135	180	64	16
40—	149	111	66	34	13
30—	97	81	31	21	7
20—	69	43	15	9	1
10—	33	18	4	8	---
0—	8	6	2	---	---
No. of cases -----	550	692	939	660	289
Means -----	46.05	56.69	71.55	79.58	85.41
Standard Dev. -----	19.95	20.40	21.86	24.00	20.68

INSTRUCTIONS TO EXAMINER ACCOMPANYING THE TESTS

1. The actual amount of time given for work on all the tests is 24 minutes.
2. The time required to give the entire group of tests, including filling in the blanks and giving instructions is between 35 and 40 minutes.
3. If necessary, the tests may be given in two sittings, giving the first four tests during the first sitting and the remaining three at a second sitting not more than two days later.
4. In giving the tests, pass out the booklets and have the pupils fill the blank spaces on the front page.
5. Before any work is done on the tests say to the pupils, "You are now to be given some tests in reading. In each of these tests you must do your best because we want to compare your marks with the marks which other pupils make. In these tests you must play fair. Never start any test until you are told to do so, and you must also stop as soon as you are told. If you should finish any test before you are told to stop, wait quietly for the rest to finish. Never turn a page unless you are told to do so either by me or by a sentence

at the bottom of the page. Always give careful attention to the directions."

6. Now say to the pupils, "Look at the directions for Test I, WORD MEANING, at the bottom of the first page while I read them aloud." Use this same formula for all the remaining six tests, substituting the proper test number, name, and page to suit the test. The examiner will turn each page with the pupils, instructing them in the beginning how to fold the books back.
7. Time is to be allowed for the tests as follows:

Test I: Word Meaning	-----	3 minutes
Test II: Rate	-----	3 minutes
Test III: Fact Material	-----	3 minutes
Test IV: Following Directions	-----	3 minutes
Test V: Total Meaning	-----	2 minutes
Test VI: Central Thought	-----	5 minutes
Test VII: Organization	-----	5 minutes

DIRECTIONS FOR SCORING

1. In correcting the tests use the answers provided in this manual.
2. Give credit for the answer that was evidently intended as the final one. For example, if two words were underlined, but it is evident that one of the two was the final choice, give credit for such a choice.
3. In any test where but one word is to be underlined or one statement checked, count as wrong if two or more of them are so indicated, unless it is clear that one was intended as the final choice.
4. Any method of indicating the correct answer is acceptable in the tests except in Test IV: Following Directions, in which the directions must be carried out exactly. It would be acceptable for instance, to encircle the word and put the number after it in each exercise in Test I: Word Meaning which according to directions should be underlined and the number put after it.
5. Below each test is given a statement telling how the raw score is obtained for that test.
6. To find the total of the raw scores, find the sum of the raw scores on the separate tests, having previously divided the score in Test II: Rate by ten.

DIAGNOSTIC READING TESTS

CORRECT ANSWERS FOR VARIOUS TESTS

TEST I		TEST II		TEST I	
Form I		Forms I and II		Form II	
Ans.	Number	Find total number of words read during the first minute. This is indicated by the word which the child was reading at the end of the first minute. At the end of each line is the number of words from the beginning of the story to the end of the line. Subtract from the score at the end of the line on which the pupil was reading at the end of the first minute the number of words in that line not read. For example, if the pupil has marked the word "of" in the second line of the third paragraph, Form I, as his place of reading at the end of the first minute, subtract from 143, at the end of the line, 3, as the number of words not read in the line. His rate score is then 140.		Number	Ans.
3	(1)			(1)	4
4	(2)			(2)	3
1	(3)			(3)	1
2	(4)			(4)	1
3	(5)			(5)	2
2	(6)			(6)	2
2	(7)			(7)	2
3	(8)			(8)	2
4	(9)			(9)	3
3	(10)			(10)	2
4	(11)			(11)	3
2	(12)			(12)	4
1	(13)			(13)	4
3	(14)			(14)	4
1	(15)			(15)	1
2	(16)			(16)	4
3	(17)			(17)	1
3	(18)			(18)	1
3	(19)			(19)	2
1	(20)			(20)	2
4	(21)			(21)	3
2	(22)			(22)	2
2	(23)			(23)	4
1	(24)			(24)	4
3	(25)			(25)	3
1	(26)			(26)	1
2	(27)			(27)	4
3	(28)			(28)	1
3	(29)			(29)	3
4	(30)			(30)	3
1	(31)			(31)	1
3	(32)			(32)	1
4	(33)			(33)	4
1	(34)			(34)	3
3	(35)			(35)	4
3	(36)			(36)	3
3	(37)			(37)	4
2	(38)			(38)	4
4	(39)			(39)	2
4	(40)			(40)	4
		TEST III			
		Do not discount if more is written than called for.			
		Do not discount if correct answers are given in other words.			
		Form I	Form II		
		1. lead	1. signals		
		2. graphite	2. enemy, buffalo, or		
		3. mines	battle won		
		4. yes	3. smoke		
		5. clay	4. built fire		
		6. Central Europe	5. grass, weeds, or		
		7. little	cedar		
		8. hard	6. blanket		
		9. lamp black	7. raise blanket		
		10. mills	8. number of puffs		
		11. dough	9. night		
		12. black	10. war		
		13. square	11. blanket		
		14. large	12. blanket		
		15. long as pencils	13. circle		
		16. dry	14. above head		
		17. carbon dust	15. dust		
		18. oven	16. smoke		
		19. several hours	17. sign		
		20. weed	18. hunting		
			19. Indian near		
			20. white man		

TEST IV

Count as wrong if more is done than is called for. Answer must be exactly right.

Form I

1. Vertical line between squares
2. Cross in, on, below or above second circle
3. "Stars" on blank space
4. Circle around "9"
5. Straight line from A to B or from middle of left side to middle of right
6. Circle in space below
7. Line around "new"
8. Figure 1 in the circle.
9. Line under Saturday
10. Line from top to bottom of egg

Form II

1. The word "one" on line
2. Cross in, on, below, or above second circle
3. Vertical line at right
4. Circle in upper right hand corner
5. One dot in any corner
6. Cross in circle and circle around cross
7. Line enclosing any two circles separately or together
8. Straight diagonal line from H to N or from upper left to lower right corner
9. Word "three" on line
10. Circle around "8"

TEST V

Do not count as wrong if right answer is indicated by another method than underlining.

Form I

1. storm
2. beautiful
3. feast
4. rich
5. battle
6. worried
7. excited
8. harvest-time
9. camping
10. evening
11. quiet
12. lonely

Form II

1. strong
2. raining
3. frightened
4. cold
5. farm
6. winter
7. trees
8. busy
9. sad
10. ugly
11. handsome
12. Indian

TEST VI

Do not count as wrong if right answer is indicated by another method than encircling letter before proper statement.

Form I

1. a
2. d
3. b
4. a
5. c
6. d
7. b
8. a
9. c
10. d

Form II

1. b
2. a
3. c
4. d
5. b
6. a
7. c
8. d
9. b
10. a

TEST VII

The correct order of the statements is as follows:

Form I

No. 1. 2-3-1-4
 No. 2. 2-4-3-1
 No. 3. 1-2-4-3

Form II

No. 1. 1-3-4-2
 No. 2. 2-3-1-4
 No. 3. 3-2-4-1

TEST VIII

To score the Organization Test place at the left of each set of statements below a set of paragraphs the correct numbering as shown on the accompanying scoring device. Get the difference between the correct number and the number given by the pupil in each case whether that difference is negative or positive. For each omitted number put down a difference of 2 points. Add all these points of difference, divide the total by 2 and subtract this from 12. The following is an illustration.

Correct Numbers	Differences	Number Given by Pupil
First set		
1 -----	-	1
3 -----	1	4
4 -----	1	3
2 -----	-	2
Second set		
2 -----	-	2
3 -----	-	3
1 -----	3	4
4 -----	3	1
Third set		
3 -----	1	2
2 -----	1	3
4 -----	2	-
1 -----	-	1
Total		12
 $12 / 2 = 6$		
12 — 6 is 6 (the Pupil's score)		

DIAGNOSTIC READING TESTS

FORM I

TEST I: WORD MEANING

DIRECTIONS

On the next page are such exercises as:

To be *weary* is to be 1 tired 2 lazy 3 dull 4 quick----- (1)

Here the word which completes the meaning of the sentence or makes it true is "tired," so a line is drawn under *TIRED*. And the word "tired" is number 1; so a figure 1 is placed in the parenthesis at the end of the sentence. The sentence now reads, "To be weary is to be tired." In each exercise on the next page there is a choice of four words or groups of words, but only one completes the meaning of the sentence or makes it true. Draw a line under that word which makes the sentence true as shown in the sample. Then put the number of the right word at the end of the sentence, in the parenthesis. Work as rapidly as you can, being sure to do them right. Do not start until you are told and when you are told to stop you must stop at once. Turn! Go!

TEST I: WORD MEANING

1. A *dress* is something to 1 drink 2 eat 3 wear 4 throw---- ()
2. A *letter* comes in the 1 water 2 air 3 store 4 mail ----- ()
3. A *rock* is a big 1 stone 2 animal 3 train 4 flower----- ()
4. To *buy* something means to 1 drink 2 pay for 3 run 4 play-- ()
5. The *length* of a stick tells how 1 heavy 2 hard 3 long 4 smooth-- ()
6. A *lake* is made of 1 sand 2 water 3 hills 4 oceans----- ()
7. *Spain* is the name of a 1 king 2 country 3 woman 4 car---- ()
8. An *automobile* is a kind of 1 paper 2 chair 3 car 4 horse---- ()
9. A *kettle* is used for 1 colds 2 games 3 fishing 4 cooking--- ()
10. *Honest* means to be 1 funny 2 old 3 truthful 4 pretty----- ()
11. An *enemy* is one who 1 loves 2 pleases 3 weeps 4 hates---- ()
12. *Freedom* means to have 1 war 2 liberty 3 care 4 trouble-- ()
13. To *reply* means to 1 answer 2 cry 3 laugh 4 sleep----- ()
14. To *strike* means to 1 carry 2 stop 3 hit 4 play----- ()
15. A *huge* rock is one that is 1 big 2 rough 3 pretty 4 smooth--- ()
16. To *enlist* is to 1 accept 2 enroll 3 disgrace 4 explain----- ()
17. A *reward* is a kind of 1 town 2 story 3 payment 4 school-- ()
18. A *member* is one who 1 speaks 2 believes 3 belongs 4 talks---- ()
19. A *tribe* is a big 1 house 2 animal 3 family 4 plant----- ()
20. A *luxury* is something 1 unnecessary 2 young 3 long 4 heavy-- ()
21. A *bead* is an 1 officer 2 injury 3 error 4 ornament----- ()
22. *Utmost* means the 1 oldest 2 greatest 3 triumph 4 disguise--- ()
23. *Positive* means to be 1 untrue 2 certain 3 careless 4 great -- ()
24. To *irrigate* is to 1 water artificially 2 annoy 3 object 4 talk-- ()
25. An *annoyance* is a 1 vehicle 2 proclamation 3 vexation 4 mistake-- ()
26. A *jerk* is a sudden 1 twist 2 terror 3 curve 4 noise----- ()
27. To *pour* means to 1 drive 2 empty 3 lack 4 hurt----- ()
28. An *alderman* is the 1 shepherd 2 sailor 3 official 4 element--- ()
29. *Theft* means 1 covering 2 doctrine 3 robbery 4 music---- ()
30. An *oath* is a 1 murder 2 trial 3 treaty 4 pledge----- ()

31. *Garlic* has 1 odor 2 curiosity 3 discretion 4 banners----()
 32. *Ignorance* means without 1 freedom 2 vision 3 knowledge 4 art--()
 33. To *observe* means to 1 shoot 2 follow 3 destroy 4 notice----()
 34. To *shudder* means to 1 quake 2 burst 3 deny 4 neglect----()
 35. To be *riotous* is to be 1 uncouscious 2 obedient 3 noisy 4 lovely--()
 36. A *bonbon* is a 1 heresy 2 bonnet 3 dainty 4 explosive----- ()
 37. A *maze* is a kind of 1 conspiracy 2 robbery 3 puzzle 4 machine--()
 38. A *zest* is a great 1 snake 2 relish 3 arbitrator 4 disdain----()
 39. A *mediator* is one who 1 invents 2 lectures 3 governs 4 intercedes_()
 40. *Chronicle* is a kind of 1 disease 2 poetry 3 king 4 record---()
- Score is number right-----

TEST II: RATE

DIRECTIONS

This is a test to see how well you can read silently. When I say Go, begin to read the story on the next page. Read silently and only as fast as you can understand what you read, for you will be asked questions about the story when you are through. You will be marked on how much you read and on how well you answer question about the story.

Every minute I will say, "Mark." When I say "Mark," draw a line around the word you are reading, and keep right on reading. If you should finish before I say, "Stop," lay your paper aside and wait until the rest have finished. Turn! Go!

FORM I

TEST II: RATE

Is It Lead in Your Pencil?

The lead in your pencil is not made of lead.	10
Long ago people had lead in their pencils; that is probably	21
why the pencils we use are called lead pencils. Now another	32
mineral called graphite is used. This mineral is taken from	42
mines just like coal or iron ore.	49
When people began to use graphite for pencils, they	58
took it just as it came from the mines, sawed it into strips,	71
and put it into wooden casings. The lines these pencils made	82
were too black, and the "lead" was so soft that it wore away	95
very fast. Men afterwards learned to mix other materials with	105
the graphite to make the mark less black and the lead harder	120
and more lasting.	130
This is the way your pencils are made. The graphite	143
is ground into powder and mixed with the powder of a clay that	156
is found in Central Europe. Very little clay is put in if the	171
lead is to be quite soft, but, if it is to be hard, more clay	117
is added. The hardest lead pencils, marked with six H's like	182
this, H H H H H H, have more clay mixed with the graphite than	192
the soft ones, marked B B B B B B. Sometimes a little lamp	201
black is mixed in to make the lead blacker.	210
After the graphite, clay, and lamp black are mixed	219
together, they are ground in mills. They are mixed round	229

and round until they look like black dough. The dough is then	241
put in a press which has holes in the bottom. The press squeezes	254
this black dough out through these little holes. This is done	265
over and over again until the mixture is smooth enough.	275
The dough is finally squeezed through a hole of just	285
the size and shape the lead is to be. If the lead wanted is to	300
be square or round, then the hole is square or round. If the	313
size of the lead is to be large or small, then the hole is large	328
or small. The soft string of lead comes slowly through this	339
hole. It is cut into pieces as long as pencils, and these are	352
put on a tray to dry.	
As soon as a tray is filled with pieces, it is sprink-	370
led with a dust called "carbon dust" and put in the oven to bake.	383
The pieces are left in the very hot oven several hours until	395
they are perfectly dry. When they are dry they are put into	407
small blocks of wood and made into pencils.	415

Score is number of words read first minute-----

TEST III: FACT MATERIAL

DIRECTIONS

Below you will find a paragraph of a story about a Chinese boy. Under the paragraph are four questions about it which can be answered by one or more words given in the paragraph. Read the paragraphs and then write after each question the word or words which correctly answer it. If necessary re-read the paragraph before attempting to answer the questions.

"Bud was a Chinese boy. His father had named him Bud because it meant something that grows; a bud grows to be a flower. The boy's father hoped that his son would become a wise man, and hold a high office in China, his beloved country."

1. What kind of a boy is this story about?-----
2. What is the boy's name?-----
3. What did the boy's father want him to become?-----
4. Where did Bud live?-----

On the following pages you will find paragraphs and questions to be answered about the story which you just read a short time ago. Answer as many questions as you can in the time allowed, being sure to get the answers right. If you do not remember what the story said, read the paragraph just above the questions again and again, until you find the correct answer. Turn! Go!

TEST III: FACT MATERIAL

The lead in your pencil is not made of lead. Long ago people had lead in their pencils; that is probably why the pencils we use are called lead pencils. Now another mineral called graphite is used. This mineral is taken from mines just like coal or iron ore.

1. What did people use in their pencils long ago?-----
2. What mineral is used in the pencils now?-----

3. From what is the mineral graphite taken?-----

When people began to use graphite for pencils, they took it just as it came from the mines, sawed it into strips, and put it into wooden casings. The lines these pencils made were too black, and the "lead" was so soft that it wore away very fast. Men afterwards learned to mix other materials with the graphite to make the mark less black and the lead harder and more lasting.

4. Did people ever use graphite alone in the pencils?-----

This is the way your pencils are made. The graphite is ground into powder and mixed with the powder of a clay that is found in Central Europe. Very little clay is put in if the lead is to be quite soft, but, if it is to be hard, more clay is added. The hardest lead pencils, marked with six H's like this, H H H H H H, have more clay mixed with the graphite than the soft ones, marked B B B B B B. Sometimes a little lamp black is mixed in to make the lead blacker.

5. What is mixed with the graphite in pencils?-----

6. Where is the clay powder found?-----

7. How much clay is mixed with graphite to make a soft lead?-----

8. What does H H H H H H mean on a pencil?-----

9. What is sometimes mixed with graphite to make blacker lead?-----

After the graphite clay, and lamp black are mixed together, they are ground in mills. They are mixed round and round until they look like black dough. The dough is then put in a press which has holes in the bottom. The press squeezes this black dough out through these little holes. This is done over and over again until the mixture is smooth enough.

10. Where are the graphite, clay, and lamp black ground?-----

11. What do the mixed materials look like?-----

12. What is the color of the dough?-----

The dough is finally squeezed through a hole of just the size and shape the lead is to be. If the lead wanted is to be square or round, then the hole is square or round. If the size of the lead is to be large or small, then the hole is large or small. The soft string of lead comes slowly through this hole. It is cut into pieces as long as pencils, and these are put on a tray to dry.

13. For square lead through what kind of hole is the dough squeezed?-----

14. For large lead through what kind of hole is the dough squeezed?-----

15. How long are the pieces of lead cut?-----

16. Why are the pieces of lead placed on a tray?-----

As soon as a tray is filled with pieces, it is sprinkled with a dust called "carbon dust" and put in the oven to bake. These pieces are left in the very hot oven several hours until they are perfectly dry. When they are dry they are put into small blocks of wood and made into pencils.

17. With what are the pieces of lead sprinkled?-----

18. After being sprinkled where are the pieces of lead placed?-----

19. How long are the pieces of lead left in the oven?-----

20. Into what are the dry pieces of lead put?-----

Score is number right-----

TEST IV: FOLLOWING DIRECTIONS

DIRECTIONS

This is a little test to see how quickly and accurately pupils can read silently and follow directions. To show what sort of a test it is let us read this:

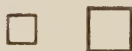
Below are the names of four children. Draw a line around the word which is not the name of a girl.

Mary John Kate Ann

This exercise tells us to draw a line around the word John. No other answer is correct. Even a line drawn *under* the word John would be wrong. On the next page are a lot of exercises of this sort. Study each exercise carefully until you are sure that you know exactly what you are asked to do. Do not start your work until told, and be sure to stop as soon as I say, "Stop." Turn! Go!

TEST IV: FOLLOWING DIRECTIONS

1. Below are two squares of different sizes. The larger square is a playground for children, and the smaller one is a garden into which children must not go. There should be a fence between the playground and the garden. Make this fence by drawing a line to separate the squares.



2. Below are six circles. They stand for one-half dozen eggs. The second egg in the row is not a good one and cannot be used for cooking. In order that mother will not make a mistake and use it you must take your pencil and mark it with a cross.

0 0 0 0 0 0

3. The flag of our country is made up of stars and stripes. The stars stand for the states and the stripes stand for the thirteen colonies. Below is written the word which stands for colonies. There is a blank space left on which you must write the word stars which stands for the states.

_____ stripes

4. There are several numbers written below. These numbers tell how many years old children usually are when they begin the different grades in school. Children are usually nine years old when they begin the fourth grade. Draw a line around the number below that tells how old children are when they begin the fourth grade.

6 7 4 9 11

5. Below is a square. John lives at A and James lives at B. But, when John and James go to visit each other, they never go all the way around the block. They go straight across the back way. Draw a straight line from A to B to show the path the boys take whenever they go to visit each other.

A B

6. Jack and Ben were playing marbles in their back yard. The boys played all the afternoon. It began to grow dark and they could not see very well. They both lost some of their marbles. Jack lost one of his and Ben lost many more. Draw a little circle below to show how many marbles Jack lost.

7. James had two balls. One was an old rubber ball; the other was a new baseball that he received from his uncle on his birthday. The other day, when James and his friend were playing ball, the new ball was lost in a field of tall grass. Draw a line around the word below that tells which ball was lost.

new old

- 8 Yesterday Grace bought three sticks of candy. On her way home from the store she met her little friends, Mary and Jane. She gave each of them a stick of candy and had one left for herself. Put a figure one in the circle below to tell how many sticks of candy Grace had left for herself.



9. We children go to school almost every day of the week. Even on Sunday we usually go to Sunday School. But on Saturday there is no school, and we just play and help around home. Draw a line under the word Saturday below to show that there is no school on that day.

Sunday Tuesday Monday Saturday

10. It was almost Easter time. Jennie had been coloring Easter eggs all day long. She made them many pretty colors. One of the eggs she colored so that one half was blue and the other half was yellow. Below is the egg. Draw a line from the top to the bottom of the egg to separate the blue from the yellow.



Score is number right-----

TEST V: TOTAL MEANING

DIRECTIONS

Below is an exercise in silent reading. Read the exercise and then draw a line under the one of the four words given beneath the exercise which correctly answers the question asked.

Read the following exercise.

The Sun is warm and bright this morning. The birds are beginning to come back from the South, and the buds are coming out on the trees and bushes.

What season of the year is it?

autumn spring summer winter

The answer to this exercise is "spring." Draw a line under spring.

On the following pages are a number of exercises like these to be done. When I say, Go, begin work. Work rapidly but remember that your answers must be correct. Remember to draw a line under only one word in each exercise. Turn! Go!

TEST V: TOTAL MEANING

1. The waves rolled mountain high. They cut and slashed the sides of the ship. The wind howled and hissed like the voice of the angry sun-god himself. The heavy hail beat upon the deck like stones. Lightning struck the doomed ship and tore it into a thousand pieces.

What do these sentences describe?

summer storm mountain rain

2. Tall, slender trees and fragrant shrubbery were near it, and bright colored birds and butterflies flashed about here and there. A clear little stream rippled and gurgled its way through the grounds. Sweet mint and purple violets, poppies, and tulips grew all around in dreamlike stillness.

What word best describes this scene?

beautiful great ugly cloudy

3. The servants were busy roasting oxen, sheep, and hogs. Some of them were making all sorts of cakes and pies. The long, brown tables fairly groaned with good things to eat, roasts of beef, and mutton, bread and fruit in heaping baskets, and bowl after bowl of yellow honey and sweet wine.

What is about to take place?

fight parade feast show

4. Jan had the largest farm, the greenest pastures, the sleekest cattle, and greatest windmill of all the men in the country of Holland. His barns were full of hay, his granary full of all kinds of grain. His house was the most beautiful and his grounds the most elaborate of any in the neighborhood.

What word best describes Jan?

poor unhappy brave rich

5. A yell, a shriek breaks the awful stillness of night. There is a great clatter of steel and a sounding of drums. The Scots spring to their feet, sword in hand. They hurry from their hiding places, charge down the long hillsides, cutting the greatly surprised Romans to pieces.

What is taking place?

battle ball-game circus fire

6. My father could see very plainly that I was not doing my work very well. It seemed to cause him more or less trouble. I was not at all surprised when one morning he said to me, "John, what will become of you? Do you want to become a good-for-nothing and some day beg for your bread?"

How did the father feel?

hungry happy worried brave

7. You can imagine my terror as the sailors cried out in loud voice, "The ship has sprung a leak." The water began to pour into the vessel in torrents, we began to sink rapidly. Everyone rushed about frantically from place to place and called loudly for help and safety.

What word tells how the people on the ship felt?

excited honest angry lazy

8. We gathered a great many dried grapes. Corn we husked by the hundred bushel. From the twenty-two bushels of wheat sown two hundred and twenty bushels were gathered. The field of rye yielded many more bushels than we had expected, and the rice crop was very good.

What time of year is pictured?

spring planting-time harvest-time winter

9. It was a happy bunch of boys. Will carried the blankets, the tent, a hunter's ax, and a good sized bag of provisions. Harry carried the fishing tackle and cooking kit. Bob carried everything from bundles of old clothes and swimming suits to musical instruments. Each of the boys had some matches and a knife.

Where were the boys going?

city ball-game store camping

10. The sun was slowly fading in the west, and one by one the stars could be

seen gleaming softly in the heavens. No robins were singing, no swallows flying about in the air. Only the shrill voice of the tree-toad, the deep croaking of the frog, and the tiresome buzzing of the locusts could now be heard.

What time of the day is it?

afternoon evening noon morning

11. Not a sound broke the stillness; not even the wind blew enough to cause a stir among the leaves. There seemed to be no man and no animal about. The little house was as silent as a grave; and so was the empty canyon. The boy was all alone in his great store-room prison.

What word best describes this scene?

excited merry sad quiet

12. For days and days he kept waiting and listening for someone to come. Every bit of rock that fell, every rustle of the breeze, every snap of a falling twig made him look for a coming footstep. But it seemed that the boy was doomed. All that came were evening and morning.

How must the boy have felt?

lonely idle good pleasant

Score is number right-----

TEST VI: CENTRAL THOUGHT

DIRECTIONS

On the following pages are some short paragraphs. After each one, you will find four statements or sentences. Each statement tells something about the paragraph. You are to pick the statement or sentence that you think tells best what the central or most important thought in the paragraph is.

Here is a paragraph for practice. Read it carefully and then read the statements that follow. Draw a circle around the letter before the statement or sentence that you think best tells the central or most important thought. Work carefully as you will have plenty of time.

"A farmer once caught a bird in a net. The bird begged the farmer to let him go free, promising that he would lead many other birds to the net. But the farmer said, "Now that I know the kind of a bird you are you shall surely die. No death is too bad for him who is ready to betray his friends."

- a. The bird asked the farmer to let him go free.
- b. The bird was told that he must die.
- c. The bird learned that it was wrong to betray friends.
- d. The bird was caught in a net by the farmer.

On the next page you will find some more paragraphs like the one you have just finished. You are to read these carefully; then draw a circle around the letter before that statement below the paragraph which you think best tells what the central or most important thought is. Be sure to draw a circle around the letter before only one statement under each paragraph. Turn! Go!

TEST VI: CENTRAL THOUGHT

1. Cod-fishing is dangerous business. Thick clouds of fog often settle over the sea more quietly and quickly than showers of rain come down on us. In the thick fog, where one cannot see fifty feet, the men in the dories sometimes lose their way. Sometimes great storms come up and upset their little boats.

- a. Cod-fishing is very dangerous business.
 - b. Heavy fogs often settle over the sea.
 - c. Men cannot see fifty feet in the heavy fog.
 - d. Storms often upset the little boats.
2. There is not room enough in France for everyone to have a large farm. The whole of France is in size about equal to Missouri, Kansas, and Nebraska; but it has seven times as many people as these three states. Each farm in France must be small, and its owner must cultivate it well to make it provide a living for the family.
 - a. France is about the size of Missouri.
 - b. Farmers in France raise many grapes.
 - c. Everyone has a large farm in France.
 - d. In France the farms are very small.
3. California is a wonderland to people who have lived all their lives in the eastern part of our country. There one may look up from the orange orchards, yellow with fruit and sweet with blossoms, and see snow-covered mountains shining in the sun. There, too, we may see the largest trees in America and the highest waterfalls.
 - a. There are many orange orchards in California.
 - b. California is a wonderland to people living in the east.
 - c. We may see snow-covered mountains in California.
 - d. America's largest trees may be found in California.
4. Many changes that were not all for the best were brought about because of the great migration of peoples from over the sea to our country. Some of the men who came had lived as sea wolves and pirates, knowing no law; some of them had been fighting nearly all their lives against such people as the Britons, Scots, or Danes. They were in many cases restless, lawless men. It was no easy matter for such men to settle down to the quiet work of a peaceful country.
 - a. The great migration brought over many rather undesirable men.
 - b. Some men who came to this country were sea wolves.
 - c. Some men who came here had been fighting the Danes.
 - d. Pirates have no regard for the law.
5. It was a poor kind of housekeeping they had in that shiftless home on Little Pigeon Creek after the mother of Lincoln had been taken away. Sarah, the eldest child, was only twelve; Abraham was but ten, and little Dennis Hanks was eight. Sarah tried to keep the house, and her father, in his careless way, tried to help her. But about all they could do was to keep from going hungry.
 - a. Sarah Lincoln was the oldest child in the family.
 - b. Abraham Lincoln's father was very careless.
 - c. The housekeeping in Lincoln's boyhood home was of very poor kind.
 - d. Abraham Lincoln sometimes went hungry.
6. The climate of the North Central States is healthful; it makes people feel like doing things. Everywhere the summers are warm or hot, with enough rain to make good crops grow. The winters are cold, with many clear crisp days. Few parts of the world have so good a climate as has the group of North Central States.
 - a. People do things in the North Central States.
 - b. The winters are cold, clear, and crisp in the North Central States.
 - c. There is plenty of rain in the North Central States.

- d. The North Central States have a very fine and favorable climate.
7. What we have a right to expect of the American boy is that he shall turn out to be a good American man. Now the chances are strong that he won't be much of a man unless he is a good deal of a boy. He must not be a coward or a weakling, a bully, a shirk, or a prig. He must work hard and play hard. He must be clean-minded and clean-lived, and able to hold his own against all comers.
 - a. A boy must never be a bully.
 - b. The best way to become a good man is to be a real good boy.
 - c. All boys must work hard and play hard.
 - d. We want all our boys to be brave.
8. Charles the First believed that God had given him the right to rule and that, therefore, he could do as he pleased. He soon made it known to the parliament and to the people of England that he intended to rule as he saw fit. He declared that neither the people nor parliament should question his doing so. At times he would say, "Am I not the king? Are not the English people my property to do with as I please? Do not the people exist only for my pleasure?"
 - a. Charles the First was a selfish and despotic king.
 - b. The king said that God made him a wonderful man.
 - c. The English people were very fond of their king.
 - d. Charles the First was a very kind and unselfish king.
9. No matter what people may say, many good times may be had on the farm in winter. The mailman delivers the mail to our door every day. When our school work is over we have time to read a great many magazines and farm papers. Of course, we have many splendid chances for coasting and skating parties. Nearly every week there is an entertainment at the church or school. Sometimes we have moving pictures, too. Usually on Saturdays we can go hunting for rabbits and quail.
 - a. Once a month we have moving pictures.
 - b. We have coasting and skating parties in the country.
 - c. Many good times may be had on the farm in the winter.
 - d. The mail is delivered right to the door on the farm.
10. The governments of white men do many things to help everybody. The people elect men to work for the government. The elected men attend to the building of roads and manage the postoffices, the schools, and the courts. In this way many helpful things can be done that a single family cannot do for itself.
 - a. The people elect men to work for the government.
 - b. The elected men manage the schools.
 - c. The family cannot do many things for itself.
 - d. The governments of white men are very helpful to everybody.

Score is number right-----

TEST VI: ORGANIZATION

DIRECTIONS

On the following pages are some paragraphs which you will be asked to read through carefully ONCE. After having read a paragraph or set of paragraphs through you are to turn to the next page and show the order in which the ideas listed there were given in the paragraphs read. Show the proper order by putting the figure one before the idea that came first, two before the idea that came

second, three before the idea that came third, and four before the idea that came fourth.

Here is a paragraph for practice. Read it through ONCE and then turn to the next page and show the order in which the ideas given occurred in the paragraphs.

Cork Trees

The Spanish summer is so hot and dry that farmers cannot grow corn for their hogs as we do in the eastern United States, or potatoes as they do in Poland and Germany. Therefore, most of the Spanish pigs are fattened on acorns in the large forests of cork oak trees.

Most of the cork used in every country of the world comes from Spain and Portugal. Cork is the soft bark of a certain oak tree. The owners of the cork forests strip the bark from the trees every nine or ten years. Then it is packed up in bundles, which are put on the backs of donkeys and mules and carried long distances to the railroads. Spain does not have as many railroads as does France or Germany, and as most of the country roads are bad, much of the freight is carried on the backs of donkeys and mules rather than in wagons.

-----Spanish summers are too hot and dry to raise corn and potatoes.

-----Spain does not have as many railroads as France or Germany.

-----Most of the cork used in the world comes from Spain or Portugal.

-----Cork bark is stripped from the trees every nine or ten years.

Stop here!

Now there will be some more of the same kind. Do not start until you are told. You can read through each set of paragraphs just ONCE. After you have turned the page, you cannot turn back. Already. Go!

TEST VII: ORGANIZATION

Caring for the Milk

1.

After the milk has been carried in pails from the barn into the milk-house, the most important thing to do is to keep it carefully protected from dust or flies so that no more germs can possibly get into it. Also it must be kept as cool as possible, to check or prevent the growth of such germs as may already be in it. This is why the old-fashioned milk-house was often built over a spring, so that the milk pans could stand in a trough full of the cool spring water which was kept flowing through it. If there was no spring, they were placed near a well and a pipe arranged so that the water could be pumped into the trough and changed frequently.

These milk-houses or pantries should be kept spotlessly clean and so arranged that they can be thrown open once or twice a week for a thorough airing and sunning. All doors and windows should be carefully screened with the finest and closest wire mesh, so as to keep out, not only flies and other large insects, but dust and midges. If ice can be had, it is much better, of course, to shut the milk into an ice box; but if cold water can be had in such a quantity as to keep the temperature of the milk down to fifty-five degrees or lower, this will do very well.

(Turn to the next page)

-----The milk should be kept as cool as possible.

-----Milk-houses should be kept spotlessly clean.

-----A most important thing is to keep the milk free from dust and flies.

-----Milk should be kept down to a temperature of, at least, fifty-five degrees.

Peanuts

2.

Every school boy and every school girl has surely seen something that came from Norfolk, Virginia, for everybody has eaten peanuts. The negroes brought peanuts with them from Africa, many years ago, and grew them around their cabins on the plantations. White people soon learned how good they were. One reason we all like them so well is that they have almost as much oil in them as there is in butter. In fact, one of the leading uses of this nut is to make peanut butter.

The nuts grow under the ground. When they are ripe, the whole plants are plowed up and stacked to dry. Then a threshing machine knocks the pods loose from the plants, just as the wheat grains are loosened from the straw. There are several counties southwest of Norfolk where nearly every farmer grows peanuts. In the city of Norfolk there are great warehouses full of peanuts waiting to be sent all over the country.

After the farmer has secured all the peanuts he can from the field, the pigs are turned in to eat those that remain in the ground. The pig's nose tells him where the nuts are, and then roots them out for him. In many parts of the South, fields of peanuts are grown especially for the pigs to harvest, peanuts being very good indeed to make pigs grow.

(Turn to the next page)

-----One reason we like peanuts so well is that they have so much oil.

-----When the farmer has secured all the peanuts he can get, he turns in the pigs.

-----The nuts of the peanut plant grow under the ground.

-----Most of our peanuts come from Norfolk, Virginia.

The People of the United States

3.

Besides being fortunate in having a good climate, our country is rich in the materials needed by man for food, clothes, shelter, fire, power, and machines. People from other countries like to come here to live because good wages can be paid in a country so rich in the things which men need. People by the thousands have come from nearly all the countries in Europe to live in the United States. Many Canadians also have come to live in the northern part of our country. In the southwest there are many Mexicans, dark-haired like their Spanish ancestors. Near the Pacific coast we find some yellow men from China and Japan. In the South are the black men whose forefathers were brought from Africa. No other nation is made up of people from so many countries.

We have over one hundred million people in this great country of ours, but there is enough land for us all. We feed ourselves and have much food to spare. This surplus we can send to the people in other countries. There is much land in the United States that we do not use for crops.

(Turn to the next page)

-----Our country has a good climate and is rich in materials needed by man.

-----People from other countries like to come here because they can get good wages.

-----We have over one hundred million people in this great country.

-----No other country is made up of people from so many countries.

Score-----

DIAGNOSTIC READING TESTS

FORM II

TEST I: WORD MEANING

DIRECTIONS

On the next page are such exercises as:

To be *weary* is to be 1 tired 2 lazy 3 dull 4 quick_____ (1)

Here the word which completes the meaning of the sentence or makes it true is "tired," so a line is drawn under *TIRED*. And the word "tired" is number 1; so a figure 1 is placed in the parenthesis at the end of the sentence. The sentence now reads, "To be weary is to be tired." In each exercise on the next page there is a choice of four words or groups of words, but only one completes the meaning of the sentence or makes it true. Draw a line under that word which makes the sentence true as shown in the sample. Then put the number of the right word at the end of the sentence, in the parenthesis. Work as rapidly as you can, being sure to do them right. Do not start until you are told and when you are told to stop you must stop at once. Turn! Go!

TEST I: WORD MEANING

1. A *dog* is a 1 fish 2 day 3 wood 4 animal_____ ()
2. The *truth* is 1 young 2 wrong 3 right 4 bad_____ ()
3. A *potato* is a 1 vegetable 2 berry 3 fruit 4 flower_____ ()
4. *Gold* is used for 1 watches 2 clothes 3 paper 4 pennies_____ ()
5. What is *wrong* is 1 good 2 unfair 3 best 4 small _____ ()
6. To *steal* means to 1 break 2 rob 3 drink 4 trace_____ ()
7. To go *across* is to go to the 1 floor 2 other side 3 corner 4 store__ ()
8. A *wife* is one who is 1 large 2 married 3 old 4 sick_____ ()
9. A *scream* is a 1 wonder 2 surprise 3 sharp cry 4 desert_____ ()
10. A *dragon* is a 1 tribe 2 fierce beast 3 danger 4 message_____ ()
11. *Almost* means very 1 long 2 high 3 near 4 pretty_____ ()
12. To *settle* is to 1 buy 2 please 3 enjoy 4 stop_____ ()
13. To *treat* is to 1 run 2 hurt 3 play 4 entertain_____ ()
14. The *breast* of an animal is the 1 back 2 head 3 foot 4 front____ ()
15. To *wreck* is to 1 ruin 2 occur 3 trust 4 refuse_____ ()
16. A *design* is a 1 game 2 sailor 3 story 4 plan_____ ()
17. A *picture* is a 1 drawing 2 dish 3 cap 4 paper_____ ()
18. An *article* is an 1 object 2 animal 3 error 4 injury_____ ()
19. To *connect* is to 1 uphold 2 join 3 support 4 infer_____ ()
20. A *deceitful* person is 1 beautiful 2 untrustworthy 3 ill 4 fall_____ ()
21. The *pulse* is the 1 labor 2 manner 3 beat 4 sight_____ ()
22. *Headlong* means 1 strangely 2 rashly 3 slowly 4 violently_____ ()
23. A *conqueror* is 1 marvellous 2 handsome 3 gracious 4 victorious_ ()
24. He *forbade* mean that he 1 came 2 accepted 3 prohibited 4 fell_ ()
25. A *suburban* place is 1 large 2 great 3 outside town 4 bright____ ()
26. A *wrapper* is a 1 garment 2 market 3 officer 4 sailor_____ ()
27. A *deceiver* is one who 1 observes 2 decides 3 suffers 4 misleads__ ()
28. *Marine* has to do with the 1 sea 2 sun 3 earth 4 temperature____ ()
29. A *settee* is a 1 serpent 2 mirror 3 seat 4 milksop_____ ()
30. To *consider* is to 1 weep 2 obey 3 think of 4 satisfy_____ ()
31. To *encompass* means to 1 surround 2 select 3 retreat 4 leave_____ ()

32. To be *appreciative* is to 1 understand 2 flaunt 3 despise 4 trim--()
 33. A *tumult* is a 1 disease 2 famine 3 reason 4 confusion----- ()
 34. The *extreme* is the 1 common 2 wrong 3 unusual 4 strong--()
 35. A *profile* is an 1 error 2 animal 3 injury 4 outline----- ()
 36. What is *accessory* is 1 final 2 adjacent 3 extra 4 absurd---- ()
 37. *Shadowy* means 1 positive 2 alive 3 silent 4 unreal----- ()
 38. To *repel* means to 1 refer 2 allure 3 declare 4 resist----- ()
 39. To *appease* means to 1 accomplish 2 satisfy 3 mention 4 affect--- ()
 40. One who is *mortal* will 1 help 2 weep 3 succeed 4 die----- ()
 Score is number right-----

TEST II: RATE

DIRECTIONS

This is a test to see how well you can read silently. When I say Go, begin to read the story on the next page. Read silently and only as fast as you can understand what you read, for you will be asked questions about the story when you are through. You will be marked on how much you read and on how well you answer questions about the story.

Every minute I will say, "Mark." When I say "Mark," draw a line around the word you are reading, and keep right on reading. If you should finish before I say, "Stop," lay your paper aside and wait until the rest have finished. Turn! Go!

TEST II: RATE

How Did the Indians Send Messages?

The Indians used signals to send messages back 8
 and forth. It a scout wanted to let his tribe know that 20
 he had a buffalo, that an enemy was near, or that a 33
 battle had been won he often used smoke to make signals. 44

He first built a fire and after it was well started 55
 he put on damp grass, green weeds, or tops of cedar trees 67
 so that it would smoke. When he was sure that his tribe 79
 had seen the smoke, he threw a blanket over the fire and held 92
 down the smoke.

Then he raised the blanket for a moment and let a 106
 puff of smoke go up. He kept sending up puffs of smoke until 119
 he had told what he wanted to tell. Those at the camp knew 132
 what he wanted to say by the number of puffs of smoke. At 145
 night smoke could not be seen, so fire signals were used. 156
 An Indian could not tell much that was happening with a fire 168
 signal, but it would waken the camp. Burning arrows shot 178
 into a camp told that war was to be made on them. 190

Motion signals were made with a blanket. An 198
 Indian nearly always carried a blanket with him. To tell 208
 his tribe that he had seen a buffalo, a scout on a horse 221
 rode in a circle until he knew that he was seen. Then he 234
 waved the blanket above his head several times. If there 244
 was no danger, he moved the blanket slowly from side to side 256
 in front of him. 260

A scout with no horse or blanket signaled by throw- 270

ing handfulls of dust in the air. The clouds of dust were	281
used the same as puffs of smoke. This made it possible for	293
the Indian to send messages to his people under almost any	304
conditions.	305
Although all Indians did not speak the same language,	314
they could speak to each other in sign language. They learned	325
these signs from each other when they met while hunting. When	336
an Indian wanted to tell a stranger that another Indian was	347
near, he rubbed the palm of his right hand over his left cheek.	360
This meant that the other person was of his own color. If he	373
wanted to tell that a white man was near, he drew his forefinger	386
across his forehead. This meant that the man wore a hat, which	398
only white men did.	402

Score is number of words read first minute-----

TEST III: FACT MATERIAL

DIRECTIONS

Below you will find a paragraph of a story about a Chinese boy. Under the paragraph are four questions about it which can be answered by one or more words given in the paragraph. Read the paragraphs and then write after each question the word or words which correctly answer it. If necessary re-read the paragraph before attempting to answer the questions.

"Bud was a Chinese boy. His father had named him Bud because it meant something that grows; a bud grows to be a flower. The boy's father hoped that his son would become a wise man, and hold a high office in China, his beloved country."

1. What kind of a boy is this story about?-----
2. What is the boy's name?-----
3. What did the boy's father want him to become?-----
4. Where did Bud live?-----

On the following pages you will find paragraphs and questions to be answered about the story which you just read a short time ago. Answer as many questions as you can in the time allowed, being sure to get the answers right. If you do not remember what the story said, read the paragraph just above the questions again and again, until you find the correct answer. Turn! Go!

TEST III: FACT MATERIAL

The Indians used signals to send mesages back and forth. If a scout wanted to let his tribe know that he had found a buffalo, that an enemy was near, or that a battle had been won, he often used smoke to make signals.

1. By what means did Indians send messages back and forth?-----
2. Give one reason why a scout sent messages to his tribe. -----
3. What kind of signal did the scout often use?-----

He first built a fire and after it was well started he put on damp grass, green weeds, or tops of cedar trees so that it would smoke. When he was sure that his tribe had seen the smoke, he threw a blanket over the fire and held down the smoke.

4. What was the first thing a scout did in sending a smoke signal?-----

5. Name one thing which a scout put on fire to make it smoke. -----

6. What did he use to hold down the smoke?-----

Then he raised the blanket for a moment and let a puff of smoke go up. He kept sending up puffs of smoke until he had told what he wanted to tell. Those at the camp knew what he wanted to say by the number of puffs of smoke. At night smoke could not be seen, so fire signals were used. An Indian could not tell much that was happening with a fire signal, but it would waken the camp. Burning arrows shot into a camp told that war was to be made on them.

7. How could a scout let a puff of smoke go up?-----

8. How could Indians tell what the smoke signals meant?-----

9. When were the fire signals used?-----

10. What was the meaning of a burning arrow shot into camp?-----

Motion signals were made with a blanket. An Indian nearly always carried a blanket with him. To tell his tribe that he had seen a buffalo, a scout on a horse rode in a circle until he knew that he was seen. Then he waved the blanket above his head several times. If there was no danger, he moved the blanket slowly from side to side in front of him.

11. With what were the motion signals made?-----

12. What did the Indian usually carry with him?-----

13. How did the scout who had seen a buffalo ride?-----

14. Where did the scout wave his blanket if he saw a buffalo?-----

A scout with no horse or blanket signalled by throwing handfuls of dust in the air. The clouds of dust were used the same as puffs of smoke. This made it possible for the Indian to send messages to his people under almost any conditions.

15. How did the scout signal when he had no horse or blanket?-----

16. What did the clouds of dust look like?-----

Although all Indians did not speak the same language, they could speak to each other in sign language. They learned these signs from each other when they met while hunting. When an Indian wanted to tell a stranger that another Indian was near, he rubbed the palm of his right hand over his left cheek. This meant that the other person was of his own color. If he wanted to tell that a white man was near, he drew his forefinger across his forehead. This meant that the man wore a hat, which only white men did.

17. What language did strange Indians use in speaking to each other?-----

18. When did the Indians learn the different signs?-----

19. What did rubbing the right hand on the left cheek mean?-----

20. What did drawing the forefinger across the forehead mean?-----

Score is number right-----

TEST IV. FOLLOWING DIRECTIONS

DIRECTIONS

This is a little test to see how quickly and accurately pupils can read silently and follow directions. To show what sort of a test it is, let us read this:

Below are the names of four children. Draw a line around the word which is not the name of a girl.

Mary John Kate Ann

This exercise tells us to draw a line around the word, John. No other answer is correct. Even a line drawn *under* the word John would be wrong. On the next page are a lot of exercises of this sort. Study each exercise carefully until you are sure that you know exactly what you are asked to do. Do not start your work until told, and be sure to stop as soon as I say, "Stop." Turn! Go!

TEST IV. FOLLOWING DIRECTIONS

1. Mary was sent to the store by her mother to buy a dozen oranges. On her way home she became hungry and ate one of the oranges. Then she had only eleven. On the line below write the word one to tell how many oranges Mary ate on her way home from the store.

2. When Helen came home from school the other day she hurried into the house and began hunting for something to eat. There were three apples lying in a row on the table. Helen took the apple in the middle because it was the largest. Below are the apples. Mark with a cross the apple that Helen took.
3. The clock struck nine times, and it was time for the boys to go to bed. One of the boys tried to draw a short line for each time the clock struck. The lines are shown below but there are only eight. Draw one more line like those below at the right side after those drawn and you will have all nine lines.
4. Jack and Harry were playing ball late one afternoon. Finally, when Jack threw the ball, it slipped from his hand in some way and crashed through the window of the school house. The window is shown below. Draw a small circle in the upper right-hand corner of the window to show where the ball went through.
5. This noon Helen's mother told her to be very careful not to spill anything on the clean tablecloth. Helen tried to be very careful, but she soon forgot and laid her spoon all covered with strawberry juice down on the cloth. When she picked up the spoon, a bad spot was left. Place a black dot on one corner of the tablecloth to show where the spot is.

6. Below you will see a circle and a cross. The circle stands for an empty pig-pen, and the cross stands for a pig outside a pen. We want to have a pig in the empty pen, and we want to have a pen around the pig that is out. You must draw a cross in the circle and a circle around the cross. You will then have two pigs in their pens.
 7. James had three nickles that he earned carrying in wood and water for his mother. When he went down to the store, he bought candy with one nickle and a package of gum with another nickle. He then had one nickle left. Below are the three nickles. Draw a circle around any two of them to show that he has but one left.
 8. To-night after school Harold is going after nuts. In the figure below, H is where Harold lives and N is where the trees are from which he will gather nuts. Harold does not want to go all the way around the road but wants to go across the field because it is nearer. Draw a line from H to N to show how Harold will go after the nuts.
 9. William had a birthday yesterday. He was nine years old. His father gave him a new knife for his birthday. The knife had four blades. William was showing the knife to some of the boys when he dropped it and broke one of the blades. There are three blades left, so write the word three on the line below.
-
10. Mary said the other day that when she was old enough she was going to be a school teacher. But Mary is only ten years old. She will not be able to teach school for eight years yet. She will then be eighteen years old. Draw a circle around the figure right below to tell how many years it will be before Mary can teach school.

9 18 8 10 3

Score is number right-----

TEST V: TOTAL MEANING

DIRECTIONS

Below is an exercise in silent reading. Read the exercise and then draw a line under the one of the four words given beneath the exercise which correctly answers the question asked.

Read the following exercise.

The Sun is warm and bright this morning. The birds are beginning to come back from the South, and the buds are coming out on the trees and bushes.

What season of the year is it?

autumn spring summer winter

The answer to this exercise is "spring." Draw a line under spring.

On the following pages are a number of exercises like these to be done. When I say, Go, begin work. Work rapidly but remember that your answers must be correct. Remember to draw a line under only one word in each exercise. Turn! Go!

TEST V: TOTAL MEANING

1. The blacksmith was an unusually strong man with large and powerful hands, a full chest, a straight back, and muscular legs and arms. All day long he would wield the heavy hammer over the anvil and lift the heavy pieces of steel and iron with which he was working.

What word best describes the blacksmith?

strong handsome idle cross

2. The storm beat upon the windows, the howling wind blew the water through the cracks in the sides of the building and under the door. People were going by with heads bent forward and partly turned back as they faced the unpleasant, soaking downpour.

What seems to be happening outdoors?

hailing raining freezing snowing

3. Painted Indians with tomahawks in their hands which they were waving wildly in the air ran into the canyon. They uttered their whoops, did some of their dances, and began to climb the stairs. They rushed from place to place looking for treasures. They had come to rob the cliff dwellers.

How must the cliff dwellers have felt?

frightened happy lazy tired

4. At last one day in midwinter there came a dreadful snow-storm. The terrible wind and the driving snow kept most people indoors. There was almost no traffic on the roads. The storm was so severe and sudden that many people lost their lives and thousands of cattle were frozen to death.

What kind of weather did they have?

cold pleasant warm sunshiny

5. I shell corn for the chickens, drive the cows from the pasture, put hay in the mangers for the horses and see that the tanks are kept full of water for the cattle and hogs. Some times I plow the ground and hoe the potatoes for my father, I am very fond of picking berries.

Where do I live?

New York farm China city

6. All of the trees of the woods were white, and the hillsides were whiter still. The voice of the stream was silent. The waters sang no longer, for they were as glass, cold and still. Here and there on the hills could be seen the children well wrapped up but happy as they came down on their sleds.

What season of the year is described?

winter summer spring autumn

7. Thousands of my fellows stood straight and beautiful in the great wood to which I belonged. Lumberjacks came in with saws and axes and cut us into logs. We were then floated downstream to certain mills along the stream where we were cut and sawed into lumber for the houses.

What were cut down with saws?

flowers posts ice trees

8. Mother's spinning wheel scarcely stopped while she gave orders. It was Saturday forenoon and all the girls had work to do. Mary was scrubbing the front porch, Jane was polishing the parlor furniture, and Esther was baking some lovely cakes. All of these things had to be done before company came.

What word describes this scene?

idle busy lazy happy

9. Suddenly a low, mournful sound reached his ears. As he looked he saw that a large company of people was marching out of the walled town. There came a number of old women, weeping and wailing and wringing their hands. There came also many small children, poorly clad and crying pitifully and whining after their mothers.

What kind of a scene is this?

joyful beautiful pitiful selfish

10. Her nose was long and crooked; her chin turned up like a horn; between was an opening in the place of a mouth, with not a sign of a tooth in it; her eyes were little and red; her hair was uncombed and greasy; the clothes which she wore were not fit for the poorest tramp of the city.

How does this woman look?

gracious pretty kind ugly

11. This young man was very tall, slender, and graceful. He came attired in a flowing robe of green velvet trimmed with a rich cream silk. He was crowned with a wreath of silver water lilies, and he carried a scepter of green reeds. As he came among them they were as impressed as though the king had come.

What word tells how this young man looked?

lazy active handsome playful

12. The man took off his leggins and mossasins and made the boy put them on. He also took off his long leather shirt and forced the boy to take it. Only the feathers he kept for himself. Before he left the spot he told the boy the whole story of the beautiful Pocahontas.

What kind of a man was he?

French Eskimo Jew Indian

Score is number right-----

TEST VI: CENTRAL THOUGHT

DIRECTIONS

On the following pages are some short paragraphs. After each one, you will find four statements or sentences. Each statement tells something about the paragraph. You are to pick the statement or sentence that you think tells best what the central or most important thought in the paragraph is.

Here is a paragraph for practice. Read it carefully and then read the statements that follow. Draw a circle around the letter before the statement or sentence that you think best tells the central or most important thought. Work carefully as you will have plenty of time.

"A farmer once caught a bird in a net. The bird begged the farmer to let him go free, promising that he would lead many other birds to the net. But the farmer said, "Now that I know the kind of a bird you are you shall surely die. No death is too bad for him who is ready to betray his friends."

- The bird begged the farmer to let him go free.
- The bird was told that he must die.
- The bird learned that it was wrong to betray friends.
- The bird was caught in a net by the farmer.

On the next page you will find some more paragraphs like the one you have

just finished. You are to read these carefully; then draw a circle around the letter before that statement below the paragraph which you think best tells what the central or most important thought is. Be sure to draw a circle around the letter before only one statement under each paragraph. Turn! Go!

TEST VI: CENTRAL THOUGHT

1. No other people use so many potatoes as the Germans. Potatoe flour is used, together with wheat and rye, to make bread. Dry potatoes are fed to pigs and cows. Alcohol that is made from potatoes is sometimes used to run automobiles.
 - a. Potatoes are fed to pigs and cows in Germany.
 - b. No other people use so many potatoes as the Germans.
 - c. Alcohol is made from potatoes in Germany.
 - d. German people themselves never eat potatoes.
2. Franklin was greatly interested in the study of science. He "snatched lightning from the skies" by the use of a key and a kite. This experiment led to the invention of the lightning rod, which was soon placed upon many buildings. He invented the "Franklin Stove"—an open stove made in such a way as to economize heat and save fuel. He also invented a street lamp which was used in Philadelphia.
 - a. Franklin studied science and made a number of inventions.
 - b. Franklin snatched lightning from the skies.
 - c. Franklin's stove was called the "Franklin Stove."
 - d. Franklin invented the lightning rod.
3. American colonists justly felt that England had not always treated them with fairness. England had passed many laws which the colonists did not wish. She had forced a law forbidding the colonists to trade with any country but Great Britain. She had even passed a law refusing to allow the colonists to make articles of iron for their own use. She interfered with American industries in many ways.
 - a. England interfered with American industries.
 - b. The colonists could trade only with Great Britain.
 - c. There were many reasons why the colonists felt that they were not treated fairly.
 - d. The colonists made things out of their own iron.
4. Abraham Lincoln kept on reading and studying at home. His stepmother said of him, "He reads everything he could lay his hands on. When he came to a passage that pleased him, he would write it down on the wooden shovel or boards, if he had no paper. Then he would copy it, commit it to memory, and repeat it again and again."
 - a. Abraham Lincoln had a stepmother.
 - b. Abraham Lincoln would write on the shovel or on boards.
 - c. Abraham Lincoln enjoyed many passages which he read.
 - d. Abraham Lincoln read much and studied hard.
5. In New York so many people crowded the street cars that elevated railways as high as the third story windows of homes have been built. Even these cannot carry all the people who need to ride. Thousands of men are busy every day loading and unloading ships, driving trucks, and wagons about the streets, running barges in the harbor from ship to ship and from ship to wharf. New York is a big and busy city.
 - a. An elevated railway is built in New York.

- b. New York is a very big and busy city.
 - c. Thousands of men unload ships in New York.
 - d. All the people in New York cannot ride on the railways.
6. It is interesting to know that Grant was a real leader in all the games and sports that boys of his time loved. No boys in his neighborhood could out-run or outjump him. He had great fun in fishing and hunting. He was an excellent swimmer. Nearly every day when his farm work was done, he and the other boys would go to the river for a swim. This great amount of time spent in games and sports kept him in good health.
- a. Grant enjoyed and led in all kinds of games and sports.
 - b. Grant liked to hunt a great deal.
 - c. Grant could outjump any boy in school.
 - d. Grant used to go swimming in the river every evening.
7. The mother of George the Third was very anxious for him to be a real king. She was constantly saying to him, "George, be a king." This constant reminder filled George with lofty notions of the power and rights of the king. These lofty notions caused him to determine to become the king in earnest. He made up his mind that he would not only be a king in name but that he would be one of England's greatest rulers.
- a. Some kings of England had been poor ones.
 - b. George's mother said, "George, be a king."
 - c. George the Third was determined to be a real king of England.
 - d. George the Third had some very queer notions.
8. An important article in the Pilgrim home was the spinning wheel. Sometimes there were several wheels in the household. Hours and hours were spent by the women at their wheels. All the wool and linen with which their clothes were made had to be spun, woven, dyed, cut, and sewed by them. They never bought ready-made clothes in those days.
- a. The women spent some hours at the spinning wheel.
 - b. Sometimes there were several wheels in the house.
 - c. The pioneers never bought many read-made clothes.
 - d. A very important article in the Pilgrim home was the spinning wheel.
9. In the old days before telegraph wires were strung all over the country, it took weeks to carry news to places far away. There were no railroads, and the mails had to travel slowly. A boy on horse trotted along the road to carry the mail bags to country places. From one large city to another, the mails were carried by stage-coaches.
- a. They had no telegraph poles in the old days.
 - b. In the old days news and mails travelled very slowly.
 - c. Years ago a boy used to carry mail on horseback.
 - d. We have many railroads in the country these days.
10. The judge looked at the woman sternly and spoke in a quiet, grave voice. "Your gossip is much like the feathers. It is easy to scatter your stories over the world. But, like the feathers, they cannot be gathered together again. You may say, 'I am sorry, I take them back,' but you cannot. That is an impossible task."
- a. Gossip, like feathers, can be easily scattered, but not gathered again.
 - b. The judge looked at the woman sternly and spoke gravely.
 - c. The woman had been gossiping with the neighbors.
 - d. The woman said, "I am sorry, I take them back."

Score is number right-----

TEST VII: ORGANIZATION

DIRECTIONS

On the following pages are some paragraphs which you will be asked to read through carefully ONCE. After having read a paragraph or set of paragraphs through you are to turn to the next page and show the order in which the ideas listed there were given in the paragraphs read. Show the proper order by putting the figure one before the idea that came first, two before the idea that came second, three before the idea that came third, and four before the idea that came fourth.

Here is a paragraph for practice. Read it through ONCE and then turn to the next page and show the order in which the ideas given occurred in the paragraphs.

Cork Trees

The Spanish summer is so hot and dry that farmers cannot grow corn for their hogs as we do in the eastern United States, or potatoes as they do in Poland and Germany. Therefore, most of the Spanish pigs are fattened on acorns in the large forests of cork oak trees.

Most of the cork used in every country of the world comes from Spain and Portugal. Cork is the soft bark of a certain oak tree. The owners of the cork forests strip the bark from the trees every nine or ten years. Then it is packed up in bundles, which are put on the backs of donkeys and mules and carried long distances to the railroads. Spain does not have as many railroads as does France or Germany, and as most of the country roads are bad, much of the freight is carried on the backs of donkeys and mules rather than in wagons.

-----Spanish summers are too hot and dry to raise corn and potatoes.

-----Spain does not have as many railroads as France or Germany.

-----Most of the cork used in the world comes from Spain or Portugal.

-----Cork bark is stripped from the trees every nine or ten years.

Stop here!

Now there will be some more of the same kind. Do not start until you are told. You can read through each set of paragraphs just ONCE. After you have turned the page, you cannot turn back. Already. Go!

TEST VII: ORGANIZATION

The American Robin

1.

The American robin belongs to the thrush family, of which the mocking bird, catbird, and brown thrush are members. It makes its home in almost all sections of the country, and is one of the first birds to arrive in spring. It comes as early as March and is one of the latest birds to take its flight southward in the fall.

The robin enjoys life on the farm near the home of man, following close upon the plow and spade, and often becoming quite tame. It feeds on insects such as flies, grasshoppers, bugs, ants, and the like, and is a great blessing to man in protecting plant life from these pests, which it devours. As dainty morsels, it is fond of cherries and strawberries, and sometimes makes a meal of them; but after all it lives in large part on worms and insects picked out of the ground. The fruit that it eats is principally wild.

The robin's nest is often built in the crotch of a fruit or shade tree, but sometimes it is lodged in the corner of a hedge or grape arbor. It is composed of grasses, leaves, and roots, with an inner wall of fine grasses and mud. In the nest it lays from three to five plain, greenish-blue eggs, and two broods of robins are hatched each year.

(Turn to the next page)

- The American robin belongs to the thrush family.
- The robin lives mainly on insects and worms.
- The robin often builds his nest in a tree or hedge of some sort.
- The robin is one of the first birds to arrive in the spring.

A Copper Center

2.

At Butte, Montana, there is a great hill with many wonderful seams or veins of copper in it, running down deep into the ground. Tunnels and passages are being dug through it in all directions, and every day carloads of copper ore are lifted to the surface by electricity. Thousands of men work there all the time, and under this hill there are hundreds of miles of abandoned tunnels.

Butte produces almost nothing to sell except copper and silver, but these are of great value, and much money is received from their sale. The stores in Butte have as many things in them as those of any other town or small city, and the children have just as fine schools and desks and books as have the children of New York or Chicago.

The mines of Butte make it possible for Montana to produce more copper than Michigan for a few years; but now the state of Arizona leads in producing copper. In Utah and at Ely in eastern Nevada, copper ore has been found in deposits that can be worked with steam shovels. This method is much easier and safer than going underground. Mining is hard and often dangerous work. Sometimes when the men are hundreds of feet below the surface digging passages in the rocks and blasting them out with dynamite, great masses of rock fall in on them, or imprison them far underground.

(Turn to the next page)

- Butte has almost nothing to sell except copper and silver.
- For a few years Montana produces more copper than Michigan.
- A great hill at Butte, Montana, contains many wonderful seams or veins of copper.
- Mining is found to be very hard and often dangerous work.

The Early Indians

3.

When white men first came to America, they thought it was a country called India, of which they had often heard. Therefore they called the people whom they found here Indians. They also called them red men because their skins were about the color of an old copper cent. These red men did not have many tools, and they lacked many other things which makes it easy to work and to live. As they had no horses, cows, pigs, sheep, or chickens, they had to catch wild animals for food. They had no guns or rifles; so they made spears and

bows and arrows with which to kill their game. They had no iron; so their arrow points and spear heads were of sharpened stone, as were also their heavy tools called tomahawks, shaped something like our hatchets. The tomahawk is a very dull, poor hatchet, however. As they had no cloth for clothing, they used the skins of wild animals which they caught in traps or shot with their bows and arrows. Instead of houses, they had tents or wigwams made of skins. When the white man came, his things seemed wonderful to the Indians, and they were very happy to trade furs and skins and game for blankets, guns, powder, and bullets. The Indians like bright, pretty things, so they were very fond of trading for beads to make necklaces and ornaments for their leather suits.

(Turn to the next page)

-----Having no cloth for clothing, the Indians used the skins of wild animals for clothes.

-----The red men had very few tools to work with.

-----The Indians were happy to trade with the white men for guns and tools.

-----The red men were called Indians because white men thought this country was India when they first came.

Score-----

